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W. C. MONROE—President and Editor
LARRY O. MILLER, Advertising Manager

706 SO. VALENCIA ST.
LOS ANGELES 14, CALIFORNIA
KINZIE MILLER—Vice President

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Washington Highlights

Moving to alleviate temporary spot shortages of fuel oil in Eastern areas, the Office of Defense Transportation has ordered that 2000 of the country's railroad tank cars be made immediately available for carrying emergency supplies. Currently, there are some 100,000 tank cars in service as petroleum carriers, according to the Association of American Railroads. The Defense Transportation Office has asked Governors of all states where oil is scarce to ease their weight laws to allow heavier loading of tank trucks.

Legislation for a three-year, $30,000,000 synthetic fuels program has been voted by both the House and Senate. The appropriation is designed to ferret out better ways of obtaining gasoline and oil from coal and oil shale.

The House Foreign Commerce committee has approved a resolution calling upon the Commerce Department to consult immediately with importing countries and cut the 4,800,000 barrels of fuel oil earmarked for export in the first three months of this year.

Before the Federal Power Commission is a comprehensive plan to bring natural gas from Canada into the Pacific Northwestern states of Oregon and Washington. Northwest Natural Gas Co. has applied for a certificate to build 606 miles of 24-in. pipeline from Kingsgate, British Columbia, across Northern Idaho and into the cities of Portland, Ore., Seattle, Spokane, Tacoma and Walla Walla, Wash., and 150 miles of 18-in. line northward to Vancouver and Trail in British Columbia. Northwest Natural Gas would finance the gas carrier by sales of bonds and common stocks and possible bank loans.

Representative Gossett, a Texas Democrat, views the bill sponsored by the Interior Department for Federal ownership of tidelands as abetting socialism. Gossett, author of legislation to give states clear title to the disputed offshore lands, stated that if the Interior Department measure is enacted into law socialistic doctrine announced in the California tidelands decision of the Supreme Court would be further extended.

California representatives in Congress have received copies of a resolution adopted by the Los Angeles City Council memorializing Congress to pass pending legislation that will give California rights to its submerged coastal lands.

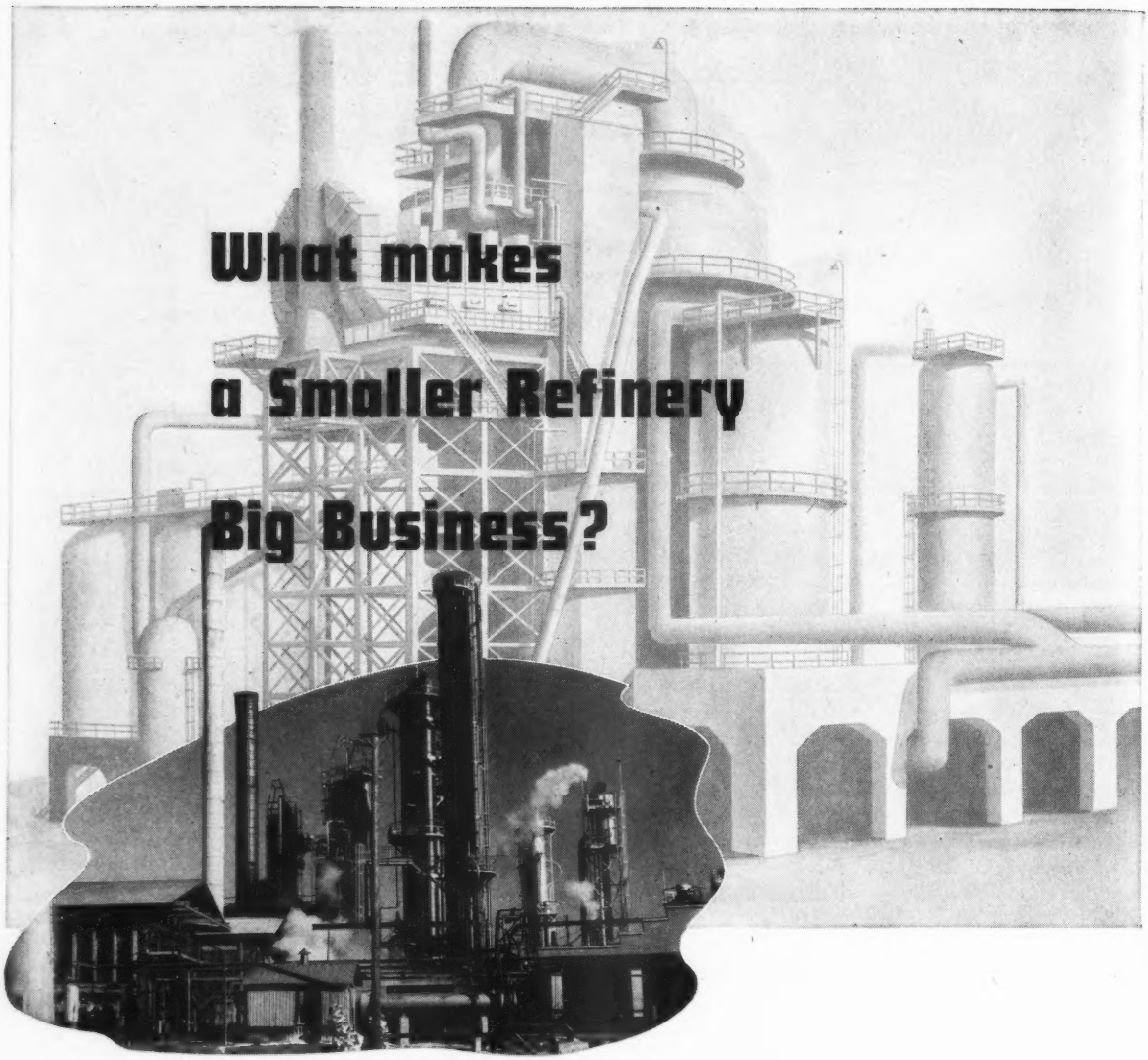
Hearings have been resumed by a subcommittee of the Senate Committee on Interstate and Foreign Commerce on H.R. 4051, generally known as the Rizley or Moore-Rizley bill. The measure was passed by the House last July but failed to reach the stage of a Senate vote. It provides for amendments to the Natural Gas act including specific and definite exemption of the production and gathering of natural gas from regulation by an agency of the Federal Government.

Tankers sold abroad in the future must carry a minimum of one cargo of oil to the United States as a part of the deal. The Maritime Commission disclosed the new policy in announcing that 10 tankers purchased by Italy will deliver at least 10 cargoes of oil to Eastern ports in United States before the tankships voyage elsewhere. A spokesman for the commission stated similar arrangements will be included in sales agreement with other foreign buyers of tankers.

The Italian tankers will carry oil from the Caribbean. It will be remembered that foreign ships cannot participate in American coastwise trade.

Senator Robert, a Republican of Wyoming, has introduced legislation to transfer two large sectors of Naval Reserve oil ground from the jurisdiction of the Navy Department to the Department of the Interior. The land singled out in the measure takes in 9321 acres of Naval Petroleum Reserve No. 2 at Teapot Dome and 30,181 acres of Buena Vista Reserve No. 3 in California.

The average price paid today for a barrel of crude oil in the United States is $2.65. Because of this there is again an incentive for the hazardous business of wildcatting for petroleum, recently commented National Petroleum Council Chairman Hallanan.



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The Utilization of Short Chain Paraffins and Olefins In The Chemical Industry

W. L. Nelson

February Meeting

Short-chain paraffinic hydrocarbons are becoming of ever-increasing importance to the chemical industry as raw materials for the synthesis of simple and complex organic chemicals. The paraffins are very important in themselves and also serve as intermediates for the olefins which can be produced from them. Because of the gas and petroleum industry's ability to market hydrocarbons at economical prices, the manufacturing chemist is dependent on this industry for a source of these paraffins and sometimes olefins.

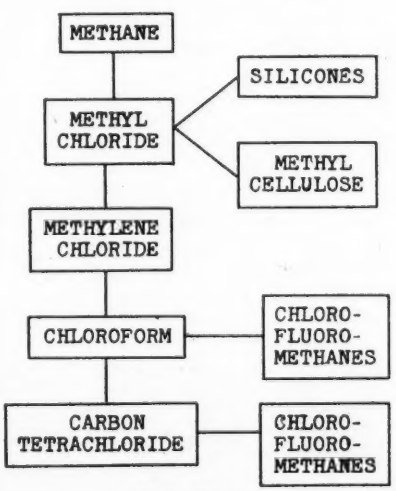
In view of the time allotted for this discussion, this talk will be limited to the paraffins, methane, ethane, and propane, and the olefins, ethylene and propylene. It would be impossible at this time to cover all the chemistry of the above five materials, but I will attempt to show some of the uses which the Dow Chemical Company makes of these simple paraffins and olefins along with some of the general reactions directly related to the materials produced by Dow, which may be carried out by other concerns.

A logical starting point in this discussion would be with the simplest of all the hydrocarbons, methane. Methane is a rather inert chemical but, under the proper conditions, it can be reacted with chlorine to produce four chlorinated substitution products. You will note in Flow Sheet No. 1 that methyl chloride, methylene chloride, chloroform, and carbon tetrachloride are all produced from this simple hydrocarbon. The reaction can be controlled so as to balance the production of the four products through broad ranges. Such a balance is necessary under changing market conditions.

Methyl chloride, a gas under normal temeratures and pressures, is used extensively as a refrigerant. However, as per Flow Sheet No. 1, it is used also as a methylating agent. Two important products are methyl cellulose and silicones. Methyl cellulose is a water-soluble resin which finds usage in the cosmetic, soap, paper, leather, and paint industries. Silicones is a generic name for organic silicon resins in which the methyl group from methyl chloride plays an important role in controlling the properties of these resins.

Methylene chloride has little use as a chemical intermediate. Its industrial applications are as a process solvent in the manufacture of cellulose acetate and in the formulation of nonflammable paint removers. It is an outstanding solvent of oxidized oil films.

Chloroform is an organic liquid which has been produced for many years, only comparatively recently, however, from methane. It has established rather broad pharmaceutical uses and is also employed as a solvent in the extraction of some vitamins and in the manufacture of penicillin.



Flow Sheet 1

Carbon tetrachloride is a large-tonnage organic chemical. Because it is the cheapest of all nonflammable organic solvents, it is used where nonflammability is of vital importance, such as in dry cleaning, general industrial degreasing, and in fire extinguisher formulations. Both carbon tetrachloride and chloroform have few chemical intermediate uses other than for the manufacture of fluorochloromethanes for refrigerant and aerosol propellent uses. It is interesting to note here that organic chemical textbooks of ten years ago report that the chlorination of methane is a reaction that has not been utilized on a commercial scale. The technique of chlorinating methane has developed to a high degree in the past several years. Methane serves the chemical industry in other important ways such as cracking to hydrogen and carbon black.

Although methane does fill an important role in the organic chemical industry, the C_2's, ethane and ethylene, offer a far broader variety of derivatives. Ethane has not yet enjoyed the unique position of ethylene. The chemical reactivity of the olefin makes possible chemical reactions which materially affect the American economy. Ethylene can be produced from ethane, propane, or various petroleum products. This country's chemical industry has made far greater use of ethylene than the chemical industry of any foreign country. This is undoubtedly due to the fact that the other important chemical-producing countries have not been fortunate to have available relatively cheap hydrocarbons and have been forced to depend on acetylene as a source of C_2's.

The chemical reactive double bond in ethylene is the entering wedge in the syntheses of a multitude of organic compounds. It will be pos-

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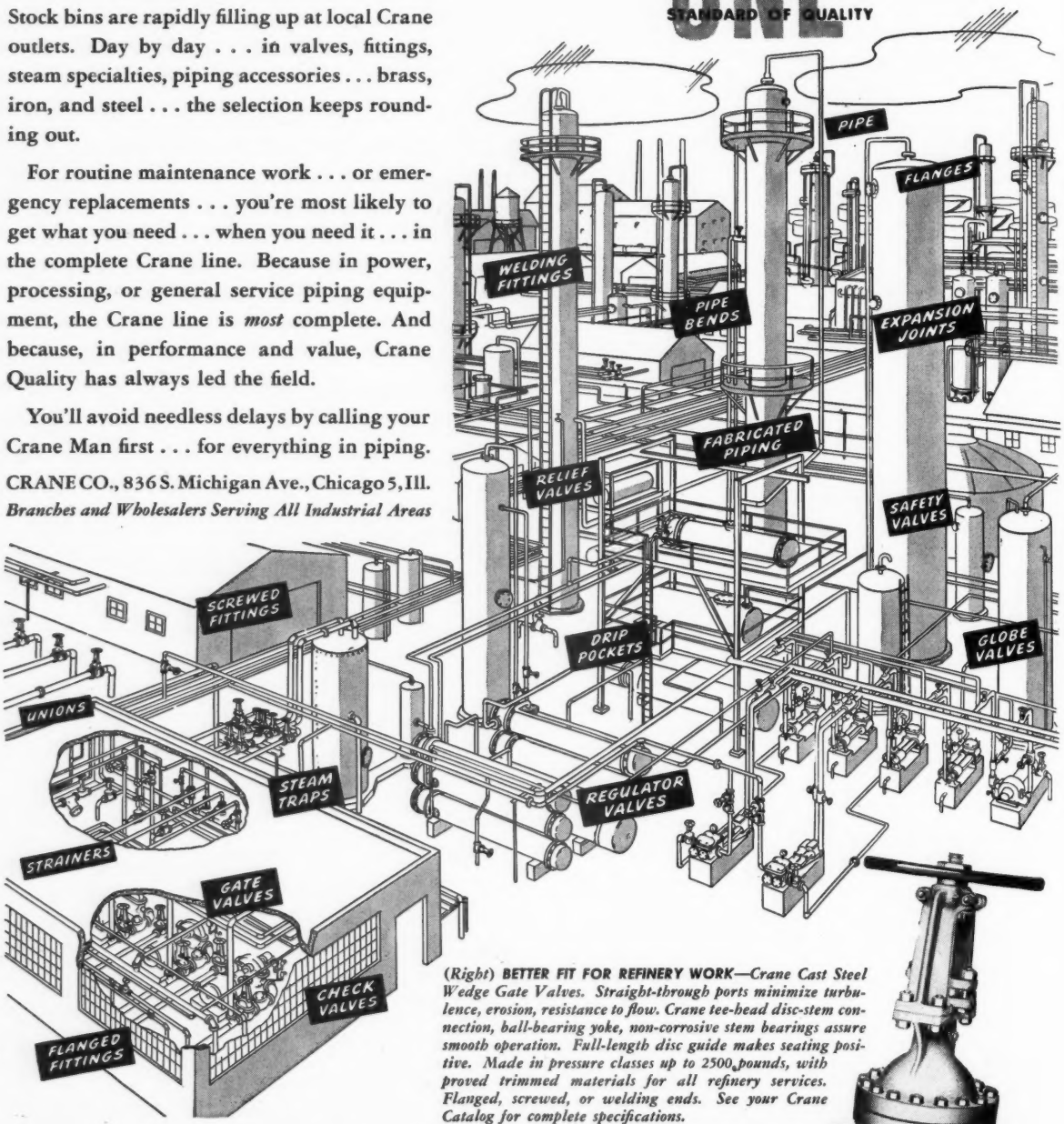

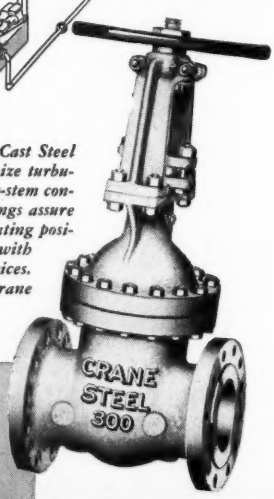

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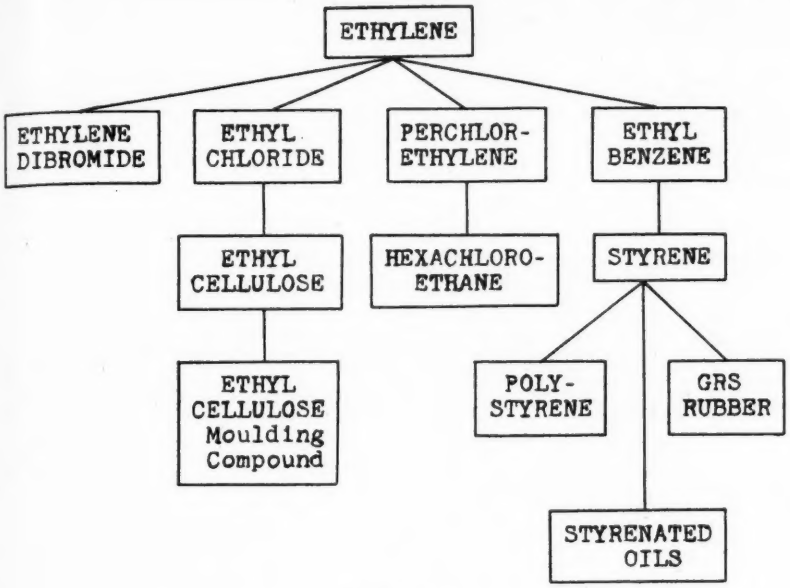


Flow Sheet 2

sible here for me to take up a small number of the chemical derivatives from ethylene. Generally, chemical derivatives from an olefin are produced by addition reactions to the double bond; however, occasionally, the substitution reaction is used.

One of the simplest compounds that is produced from ethylene is ethylene dibromide. This organic liquid is manufactured by simply bringing bromine and ethylene together under proper conditions. Ethylene dibromide's most important use is in gasoline with lead tetraethyl. Here it functions as a source of bromine to form a volatile lead compound, which insures removal of the lead from the cylinder. Ethylene dibromide is the cheapest of all gasoline miscible bromine-bearing materials and for that reason it is used extensively in leaded gasoline.

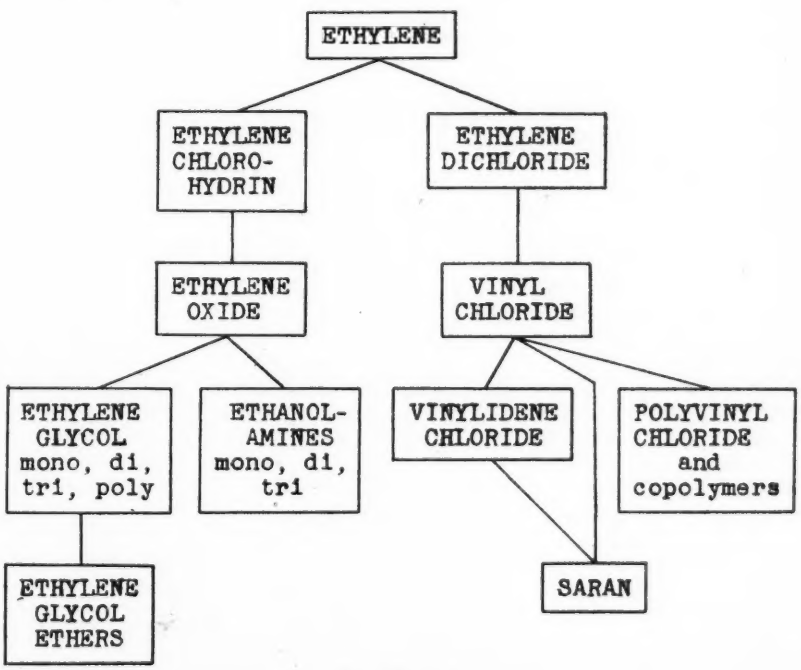
Ethylene dibromide also serves the American farmer in the capacity of an underground insecticide. It is toxic to many insects and is used as a soil fumigant for the control of wireworms and nematodes. You might be interested in knowing that last year several thousand acres in Orange and Ventura counties were treated with ethylene dibromide diluted in a medium-flash naphtha.

As shown in Flow Sheet No. 2, ethylene is also employed to produce ethyl chloride by the addition of hydrogen chloride. This ethyl chloride as such is of relatively little importance except as a chemical intermediate—as an example, in the production of ethyl cellulose. Ethyl cellulose is a cellulose ether used in the coatings industry and, when properly plasticized, in the plastics molding industry.

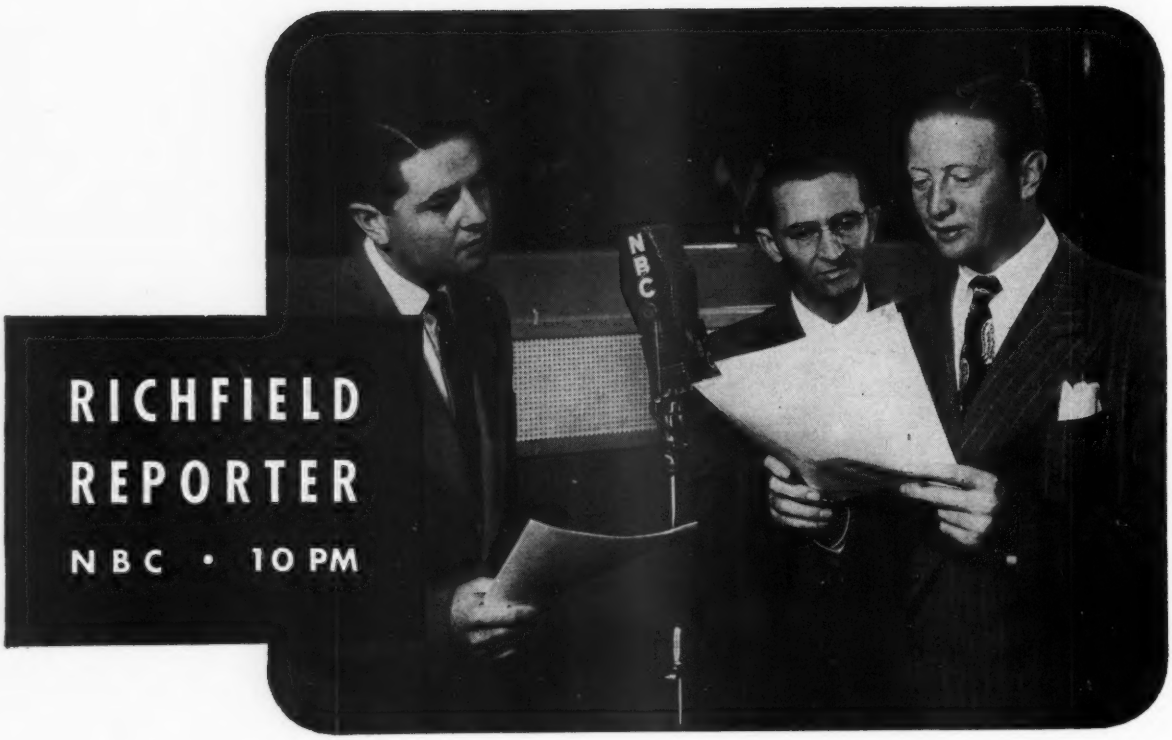
Ethylene serves also as a raw material in the production of perchlorethylene. Perchlorethylene is a stable organic solvent which is used extensively for dry-cleaning purposes and for the vapor phase degreasing of metal parts. Perchlorethylene, during the recent war, became an intermediate for the production of hexachloroethane, which the Chemical Warfare Service used with a zinc dust and other materials to produce smoke screens.

Ethylene performed another vital function during the war which has not ceased to be important today—that is, as an intermediate in the production of synthetic rubber. This rubber, a copolymer of styrene and butadiene, is still known as GRS. Styrene is produced from ethyl benzene; the latter is a benzene alkylation product using ethylene. This ethyl benzene is cracked thermally to styrene. As you all know, The Dow Chemical Company operates a styrene plant near Gardena, California, for the Rubber Reserve Corporation. This plant has a capacity of over 60,000,000 pounds per year of styrene and is at the present time operating close to capacity.

With the return of natural rubber, GRS has lost some of its economic



Flow Sheet 3



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importance compared to three or four years ago; however, styrene is a monomer that can be used to produce polystyrene. Polystyrene is finding ever-increasing use as a plastic molding compound. Although polystyrene has few applications as a coating resin for the paint industry, styrene combined with drying oils such as linseed oil or dehydrated castor oil shows great promise as a paint vehicle.

As shown in Flow Sheet No. 3, ethylene is also reacted with hypochlorous acid to produce ethylene chlorohydrin, which is in itself an important chemical intermediate in the production of a number of materials. This ethylene chlorohydrin can be readily used to produce ethylene oxide, which has become an important building block for the organic chemist. This ethylene oxide, under the proper hydrolyzing conditions, produces ethylene glycol, diethylene glycol, triethylene glycol, and higher polyethylene glycols. These glycols have wide industrial applications. The most important outlet is for ethylene glycol in the automotive antifreeze market, where it has become by far the largest-tonnage, permanent-type antifreeze sold commercially. Diethylene glycol is used very extensively in the dehydration of natural gases and other gases. Polyethylene glycols and their derivatives, the ethylene glycol ethers, find broad usage as solvents in the ink, paint, and cosmetic industries.

Ethylene oxide is also an intermediate in the production of ethanolamines, of which there are three, mono, di, and tri. Mono- and diethanolamine are employed widely for the removal of acid-reacting constituents in gases and are very important in the production of CO_2. Because all of these amines are very reactive organic bases, they are extensively used in the manufacture of surface active agents with many types of organic acids.

The chlorine derivatives of ethylene are complex. As per Flow Sheet No. 3, you will note that a number of chlorinated ethylene products are made commercially. Ethylene dichloride, manufactured by the addition of chlorine to ethylene, is an important solvent with many uses. However, it also serves as a chemical intermediate in the production of vinyl chloride. Vinyl chloride is a monomer which is polymerized with itself or with a copolymer such as vinyl acetate to produce resins. These are important in the coating of fabrics and wire, plastic conduits, plastic sheeting, and many other uses. Vinyl chloride may be further chemically processed by chlorinating under proper conditions to vinylidene chloride. This material is also a monomer, and when copolymerized with other materials such as vinyl chloride is used in the manufacture of textiles, chemical resistant conduits, and films with extremely low moisture vapor transmission.

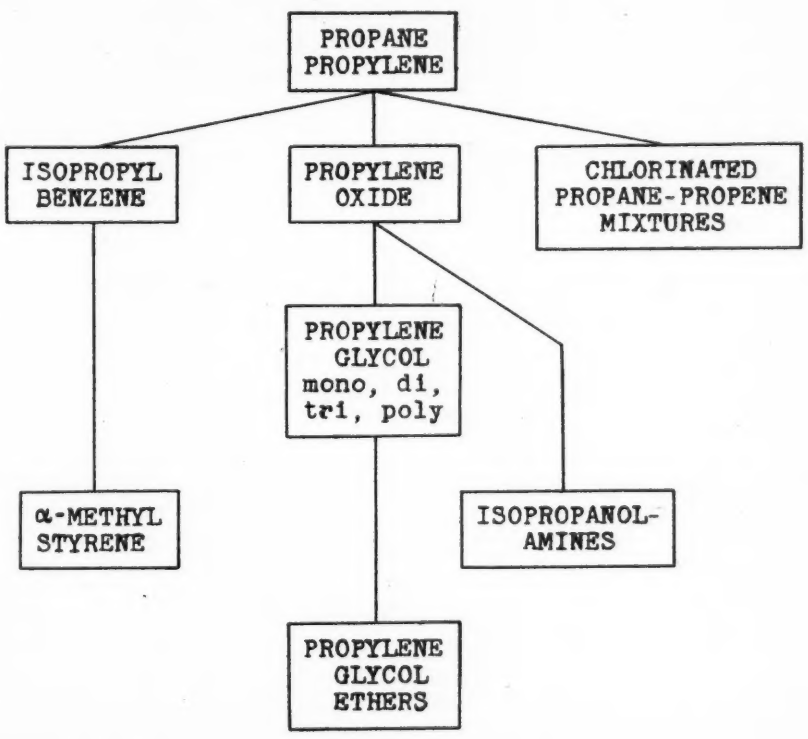
The above-mentioned products from ethylene are only the first chapters of a long story, the extent of which is still increasing.

Propane and propylene are steadily gaining more importance as chemical raw materials. Again, as in ethylene, it would be difficult to discuss all of the products produced from propane and propylene; however Flow Sheet No. 4 shows a few of them.

Many of the reactions of propylene are very similar chemically to those of ethylene. As an example, benzene can be alkylated with propylene to isopropyl benzene. Isopropyl benzene, or cumene, was used extensively during the war for high-octane blending stock for aviation gasolines. Isopropyl benzene can also be thermally cracked to alpha-methylstyrene, a copolymer for a number of resins.

Propylene, like ethylene, will react to form a chlorohydrin and this chlorohydrin can be used as a chemical intermediate for other processes or to produce propylene oxide. Propylene oxide goes through the same basic reactions as ethylene oxide to yield a series of glycols, glycol ethers, and amines. The propylene glycols differ somewhat from the ethylene glycols in solvent properties and in uses. Probably the most important difference is that monopropylene glycol is used extensively in the food industry as a solvent and a humectant. It is the only glycol which the Federal Food

(Continued on Page 52)



Flow Sheet 4

Overcoming Lost Circulation

One of the problems that must frequently be confronted in drilling an oil well is that of lost circulation. In many areas where previously drilled wells have provided data on subsurface conditions, lost circulation can be anticipated and, in some cases, even the degree of trouble estimated in advance. While such data do not always make it possible to prevent the loss of circulation, they do forewarn the driller and aid in preparing for the contingencies that may be expected. Unfortunately, lost circulation cannot always be anticipated; and when it is encountered it requires immediate remedial action.

Lost circulation, or "lost returns", is the partial or complete loss of drilling fluid into the interstices of sands and gravels, into cracks or fissures, crevices or caverns or into any voids that may be encountered when penetrating the various formations through which a well must pass. While this does not include the normal loss of water from the mud attending the deposition of a filter cake, an excessive water loss should be considered as indicating possible loss of circulation, particularly if a mud having good wall-building qualities is being used.

Probably the most common cause of lost circulation under what may be considered general stratigraphic conditions is the use of heavy mud preparatory to penetrating a high-pressure zone. Such a mud may not be "heavy" when compared to muds used at greater depths or under different well conditions. But it is heavier than that required to drill through formations above the zone where a greater pressure exists. High pressures necessitate a drilling fluid of sufficient weight to overcome the pressure of the zone in order to eliminate the hazard of a blowout; so heavy mud must be used. Yet the hydrostatic head of a heavy mud, plus the circulating pressure, will force the fluid into any stratum that carries a pressure less than that applied by the mud fluid to its face. The result is loss of circulation. The face of the offending formation must then be sealed off if the well is to be completed efficiently; in most cases it must be sealed off if the well is to be completed at all.

The weight of the drilling mud must naturally be given due consideration when treating for loss of circulation, not only the weight of the mud being used at the time recovery action is being taken but also that of a heavier mud which may be necessary later. The weight and other physical properties of the mud will vary as the amount and kind of solids vary. Weight variations may range from 62.4 lb. per cu. ft. to 150 lb. per cu. ft. or higher. Other physical properties which enter into a discussion of lost returns are viscosities and gel strengths. Viscosities, as measured by the Marsh funnel, A.P.I. standard, will vary from 27 seconds for water to well over 100 seconds for muds. Gels, as measured by the Stormer viscosimeter, will vary from zero to well over 200 grams on the 10 minute test.

Although in extreme cases the flow of drilling fluid into crevices or caverns cannot be stopped, almost any extent of lost circulation can be overcome. The problem is to prevent or eliminate the loss of circulation most effectively in the shortest time possible with the least expense. Since circulation is lost to formations of widely differing characters the treatment cannot be the same in all cases. Formations causing lost circulation may be divided into three general groups:

Group 1—Depleted oil or gas sands or any low-pressure, coarse sand formations.

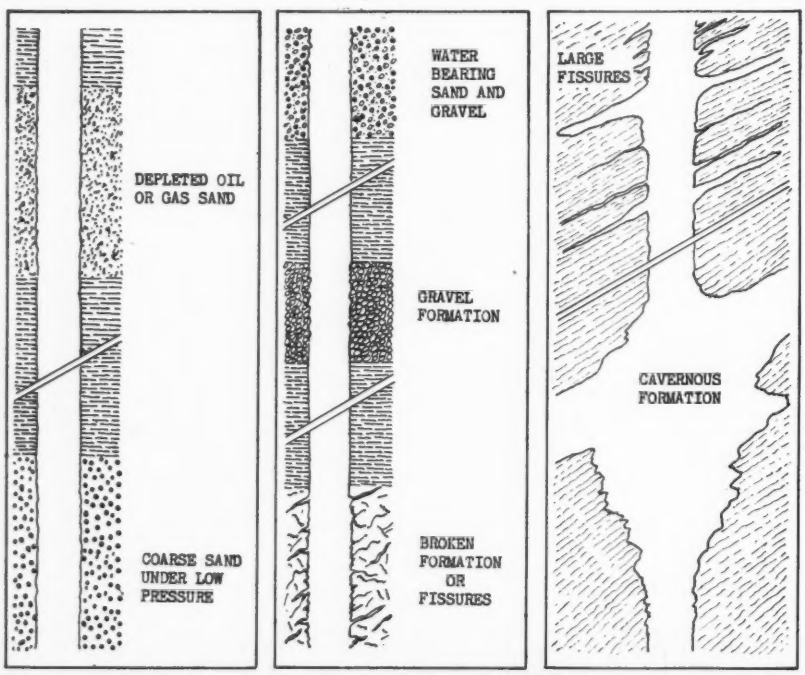
Group 2—Highly permeable zones, water sands containing gravel, gravel formations or fractured or fissured formations.

Group 3—Large-creviced or cavernous formations.

Loss of circulation (lost returns) may itself be classified into three general types, the first two types being encountered in both of the first two formation groups. The three types are:

Type 1—Low-pressure losses.
Type 2—High-pressure losses.
Type 3—Cavernous losses.

The kinds of formations causing loss of circulation will first be de-



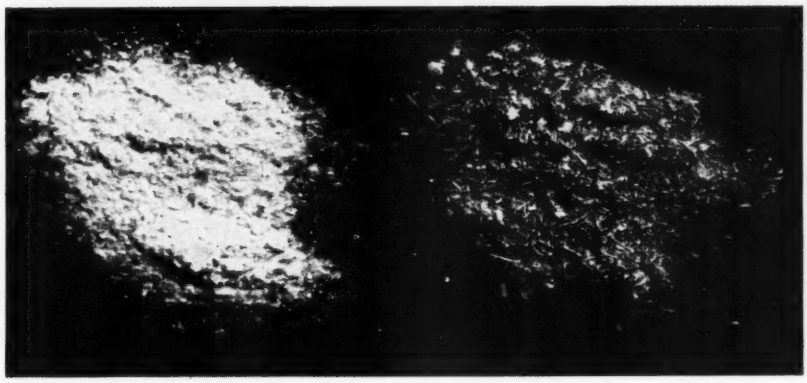
Visualization of the three general groups are here given. To the left is Group 1; in the middle, Group 2; and to the right, Group 3.

scribed; the types of circulation loss and methods for preventing or overcoming lost returns will then be discussed.

Before considering the causes and treatment of lost circulation it must be pointed out that what may seem to be a mild loss of circulation will sometimes be due entirely to the use of poor mud fluid. The importance of drilling through porous strata with mud of high wall-building qualities (low water loss and thin cake) cannot be over emphasized because not only is water lost from the drilling fluid by the use of low wall-building mud but the filter cake becomes excessively thick; moreover, any tendency to slough due to wetting will be aggravated.

Many sands taking water from the mud can be effectively sealed off by the use of the proper drilling fluid. The solids contained in the mud will not enter such sands to a depth greater than the diameter of the particles on the face of the formation. As water from the drilling mud passes into the formation it leaves the solids on the face of the formation and these solids build up to form a filter cake on the wall of the hole. This filter cake will grow in thickness as the water continues to be lost into the formation, the rate of growth and the ultimate thickness before becoming impenetrable depending upon the quantity and state of gel-forming colloids in the mud and the permeability of the formation.

A mud poor in gel-forming colloids and consequently low in wall building qualities will lose a considerable amount of water into the formation and will cause the formation of a thick filter cake before it prevents infiltration of water. In some cases the filter cake never becomes impenetrable because the drill string dislodges all or a portion of the cake before it becomes thick enough to keep water from filtering through it. Strictly speaking, this condition is one of high water loss and not loss of circulation and can be remedied by conditioning the mud by improving its wall building properties, particularly through the addition of prepared bentonite which increases the colloidal content of the fluid. If an extremely low water-loss (down to 1 cc. A.P.I. or less) is desired, an organic colloid can be used. The problem at the time of drilling through such formations is therefore one of mud control; but it may become a problem of lost circulation if, at a later date, deeper formations require the use of heavy mud and the porous, low-pressure zones above have not been properly sealed off.



Here are shown two admixtures used to combat lost circulation under certain conditions. That to the left is known as "Micatex" and that to the right, "Fibertex."

Group 1 Formations

Sands are frequently encountered in which the pore spaces are large enough to allow the drilling mud—the mixture of liquids and solids—to flow into the formation. Such strata may be truly classified as those designated Group 1 and will usually consist of sands of which the grain size and the corresponding pore spaces are much larger than those of the ordinary oil sands. These sands may be water-bearing or may be unsaturated, either permanently or temporarily; they may be depleted or partially depleted oil or gas sands of high permeability. Loss of circulation into this type of formation is usually partial, although complete loss may occur if the pore spaces are great enough.

Prevention of mild loss of circulation into a water sand is important mainly from the standpoint of drilling efficiency, economy and insurance against dissipation of cement when a string of casing is later cemented through the sand. Even a very mild loss of circulation into partially depleted productive zones, however, is usually detrimental to production from other wells taking oil or gas from the sand and its elimination is a protective measure as well as an economic procedure and insurance against trouble in future operations.

In preventing loss of circulation into formations of this type consideration must be given to the character of the formation, particularly its tendency to slough. Fortunately, as proved by caliper surveys, sands do not have as great a tendency to slough as do shales; but there are great differences in sands; and loosely consolidated sands, of which most thief sands are composed, may disintegrate around the bore and cause trouble. Since many thief zones are eventually cemented off behind casing, the treatment to overcome lost circulation should be such that the seal will not break down after the pipe is run and cause bridges that start channeling even though the sand does not take the slurry.

To regain circulation permanently with admixtures introduced into the mud fluid, the seal must be made in the formation. The cake built on the wall of the hole must not extend outward from the face to such an extent that it will be injured by the passage of tools or casing. If the use of heavier mud is expected at greater depths it must be borne in mind that the seal formed on an upper formation will then have an increased hydrostatic pressure upon it and must be able to stand the increased pressure. Ordinarily this increase of pressure is not great but the character of the formation may be such that even a slight increase will change what was once a mild loss of circulation into a serious condition even when it causes nothing more than a break-down of the formation at the face of the bore.

Group 2 Formations

Most causes of lost circulation are the formations classified as Group 2. Although this classification covers a rather varied range, the treatment is similar and will vary mainly in degree for different kinds of formation. In some cases a gravelly stratum may require more sealing material than a fissured zone while in others a fissured zone may require more than a gravel. Complete loss of circulation may occur in any of the formations of this type; but size of openings or pressure conditions may make the loss only partial.

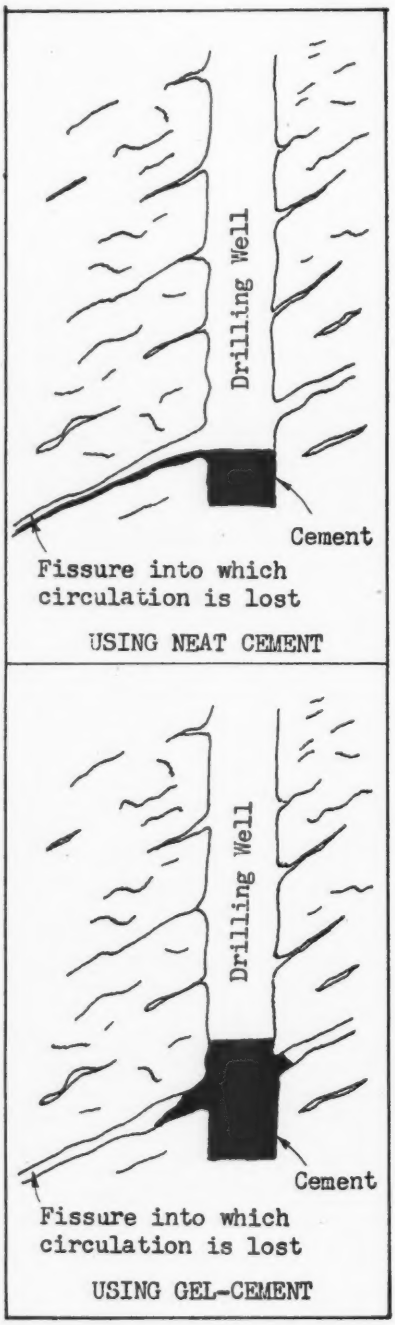
The size of the stones in beds of gravel or mixtures of sand and gravel may vary an eighth of an inch to three or four inches in their greatest dimension. Even when mixed with sand the pore spaces will be large enough to take the drilling mud, so the sealing material employed must be able to bridge the openings and keep them closed.

Fractured or fissured formations are those which have usually been deformed after they were laid down and consequently contain innumerable small cracks that range from a thirty-second to a quarter of an inch across. Drilling mud will readily flow into such crevices or fissures and when these are filled with soluble material this material is dissolved by the water from the drilling mud. Sometimes the soluble action of the water does not take place immediately and circulation is not lost until a formation has been passed through. Moreover, a complete loss of circulation may not occur immediately in formations of this character and complete loss of circulation can sometimes be prevented by treatment as soon as partial loss of fluid is observed.

The voids in formations of this kind are too extensive to be filled up with ordinary drilling mud to a point where circulation can be restored. In some wells thousands of barrels of mud fluid have been pumped away in fruitless efforts to overcome lost circulation in gravel or creviced formations, many of which contained water that was merely forced back from the hole.

Group 3 Formations

Crevices ranging in size from a few inches across to actual caverns are here classified as Group 3 and, while actual caverns are seldom encountered, the large-creviced formations have presented serious problems in some areas. Circulation is, of course, lost completely when these crevices are encountered. If they contain gas there is additional danger from that source.



The top view shows how neat cement slurry will flow down cracks or fissures that are causing lost circulation. The bottom view shows how gel-cement will build up in the fissure, plugging it off.

Overcoming Low-Pressure Losses

The term "low-pressure loss" is used to designate lost returns to porous formations where cavernous conditions do not exist but where mud is lost to the formation when mud weights of less than 105 lb. per cu. ft. are used. Such losses may occur through the whole range of weight from 67 lb. per cu. ft. to 105 lb. per cu. ft. The weight of 105 lb. per cu. ft. is arbitrarily chosen as being somewhat above normal—normal being approximately 75 lb. per cu. ft.—and below that of high weight muds.

When curative methods are taken into consideration it would appear that the loss of circulation is due to high porosity in which at least part of the individual channels have diameters greater than the bridging capacity of the particles making up the mud. These channels are still small and exhibit the same resistance or friction to fluid flow that a pipe or tube of similar diameter would show. The channels in the formation do not, of course, exhibit the symmetry of tubes either in the opening exposed to the mud or in the constancy of diameter. The openings may be any shape and the diameter will vary widely. Gelation of the mud within formation channels creates another type of resistance to flow, and, when properly controlled, has often been sufficient to restore circulation.

For all practical purposes it may be assumed that these porous sections contain fluids under a normal formation pressure or pressure greater than normal. The force tending to overcome the resistance to the flow of mud through these channels is then the difference between the hydrostatic pressure of the mud column and the formation pressure.

These low-pressure losses have been observed in practically all areas and at varying depths. The depth at which such losses occur and the subsequent operations to be performed should influence the choice of the material or method used to restore returns. A discussion of various materials and methods follows.

Mud of High Gel Strength

If loss of mud occurs at depths of less than 5000 feet and it is known that the well will be completed, or casing set, before formation pressures requiring any considerable increase in mud weight are encountered, the use of colloidal mud frequently presents a successful and easy remedy.

The procedure is simple, requiring only that sufficient prepared bentonite be mixed with the mud in the pit to give a thick high-gel mud. The quantity of the admixture needed would be three to five per cent by weight when added to drilling mud, or eight to ten per cent when added to water. Gel strength of the resulting mud, measured on the Stormer viscosimeter, after ten minutes setting time, would be approximately 200 grams. This mud is pumped into the hole and, if the gel set up in the channels is high enough, returns will be secured. Stoppage of lost returns is brought about by the resistance of the gelled mud to further movement in the formation channels.

The lack of information of the size and character of the channels makes calculation of this resistance impossible. It may be that in some instances the gel would resist the pressure imposed by added mud weight but where the need for such weight is anticipated, safety demands that casing be set through the porous zone, or other methods of curing lost returns be used. If circulation is restored, the mud may be cut back to normal and drilling resumed. If returns are not secured in a reasonable time by raising the gel strength, one of the methods described later should be used.

Hole depths of approximately 5000 feet maximum are cited because the gel also offers resistance to movement of the drill pipe and promotes swabbing until normal properties are restored to the mud by treating with chemicals and water. If much water is required to restore normal viscosity and gel, some weight material may be required to maintain a given mud weight.

Plugging and Bridging Agents

These agents are materials, either organic or inorganic, solid or semi-solid, which are mixed in the mud to prevent circulation loss when a porous formation is anticipated or encountered. The mud acts as a vehicle to carry these materials to the formation and then furnishes the smaller particles to complete the plugging or bridging action.

A distinction is here made between plugging and bridging agents because bridging denotes a degree of rigidity which cannot be attributed to such materials as cotton seed hulls, cotton bolls, beet pulp, bran, etc. These plugging materials may exhibit a rigidity, when examined in the dry form, which does not remain when they have been wetted by the fluid phase (usually water) of the mud. Shredded cellophane should also be placed in the plugging group of materials. A fibrous material now being used is primarily a plugging material but because of the length of the larger pieces which it contains, a mat is laid down which may bridge one or more channel openings. This mat in turn reduces the openings presented to the mud to a point where the mud particles will bridge them and a filter cake is then built on the mat.

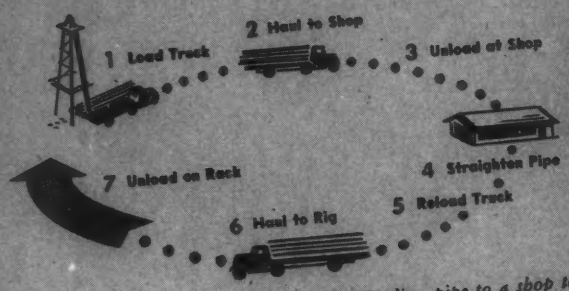
Plugging action consists of movement of particles into the formation channel until the channel opening is reduced to a diameter that will stop the material. In some instances the particles may cover entirely the face of the channel as it is exposed in the bore hole. The efficacy of these agents is measured by the degree to which they resist distortion in their pliable, wet state. Many instances are recorded where

(Continued on Page 19)

Driller J .G. Viles, at controls of diesel-powered drawworks, Standard Oil Co.'s Maxwell No. 1, near Ventura.

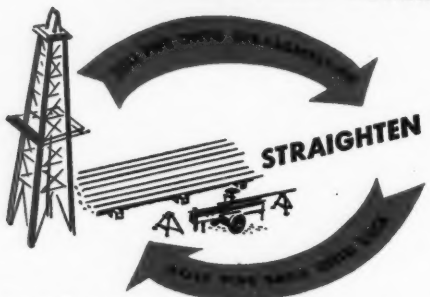
There are *TWO WAYS* of straightening pipe...

The costly time-wasting way...



Are you wasting time, money and labor hauling pipe to a shop to straighten it – tying up heavy trucking equipment – loading and unloading, handling and re-handling the pipe?

The quick, money-saving SHAFFER WAY!



You can make vital savings the Shaffer way – straightening the pipe RIGHT AT THE RIG! *Pipe can be checked, straightened and returned to the rack in a matter of minutes!*

HAVE YOU EVER STOPPED to check the many important savings you can make by straightening your bent or kinked pipe *at the well* with a Shaffer Portable Pipe Straightener instead of trucking it into a shop? The Shaffer Portable Pipe Straightener is a completely self-contained, heavy-duty unit that can be quickly hitched to a small pick-up and pulled to even the most remote well location. And it will easily handle any size pipe, casing, tubing, drill pipe or drill collars up to 6" in diameter! Here are just three of the multiple savings you make by having this compact, simple-to-operate unit *where* you want it, *when* you want it...

Savings IN TRANSPORTATION. It's simple, quick and inexpensive to tow the Shaffer Portable Pipe Straightener to the well on a regular trip when rigging-up or with a light tool-pusher's car when needed. With a Shaffer Portable Pipe Straightener on the job, there's no need to tie up a heavy, expensive truck and trailer with the time necessary to load, transport and unload the pipe at the shop... and load, transport and unload the pipe back at the rig!

Savings IN TIME. With this Shaffer Portable Pipe Straightener you simply roll the pipe from the rack onto the straightener, straighten it, and roll it back ready for instant use *in only a fraction of the time* necessary to load it on the truck and take it to the shop; let alone straightening time at the shop plus reloading and return trips!

Savings IN LABOR. The Shaffer Portable Pipe Straightener is completely power driven and simple to operate. You simply roll the crooked pipe onto the Straightener, apply pressure with the power-driven ram to straighten the bent portions, and roll pipe back to the rack. No specially-trained labor is needed!

FEATURES OF THE SHAFFER PORTABLE PIPE STRAIGHTENER

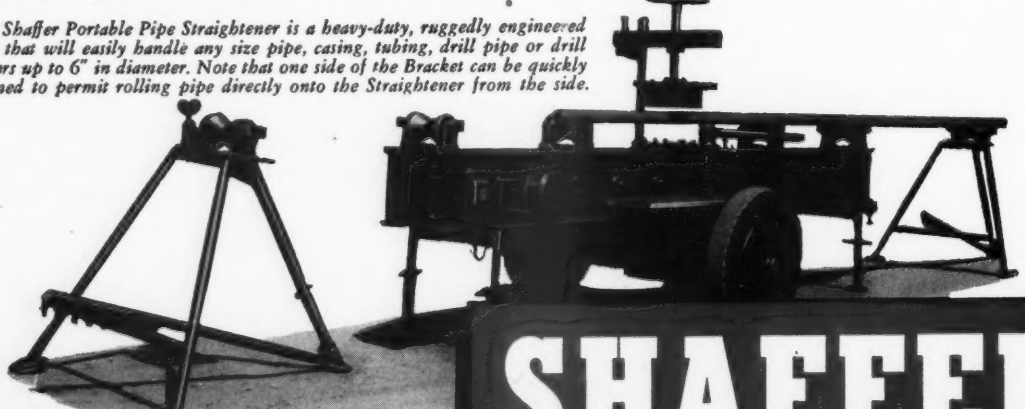
ACCURATELY ALIGNED FRAME: The rugged, non-warping frame of the Shaffer Portable Pipe Straightener consists of two 15" – 50 lb. I-beams, held in accurate alignment by two trunnion posts. The frame maintains its alignment under even the heaviest straightening loads.

FOOL-PROOF HYDRAULIC OPERATION: The pipe-straightening pressure is applied by an 8" hydraulic ram actuated by a double piston pump. Tremendous pressure is thus obtained for straightening even heavy-walled drill collars... yet the pressure is under constant and sensitive control of the operator at all times. Oil is used for the fluid, thus eliminating corrosion and maintenance problems. There is no loss of fluid during operations.

FULLY POWER DRIVEN: The Shaffer Portable Pipe Straightener is power-operated by a ¾ H.P. AC or DC reduction-gear motor. Or, the unit can be built with *both* AC and DC motors, if desired, to permit using either type of current. Or it can be operated by gasoline or gas engines where electricity is not available. It is adaptable to virtually *any* type of power!

AUTOMATIC RAM RETURN: Ram operation is controlled by a convenient valve and when the pressure is released, heavy coil springs *automatically* return the ram to its initial position. No manual or time-wasting operations are necessary to retract the ram.

The Shaffer Portable Pipe Straightener is a heavy-duty, ruggedly engineered unit that will easily handle any size pipe, casing, tubing, drill pipe or drill collars up to 6" in diameter. Note that one side of the Bracket can be quickly opened to permit rolling pipe directly onto the Straightener from the side.



There are other unique features incorporated in this unit. Contact your nearest Shaffer Representative for complete details on the many vital savings a Shaffer Portable Pipe Straightener can make for you, or write direct!

Send for the new Shaffer Catalog.
See pages 3843 to 3894 of your 1948 Composite Catalog!

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Developments In Petroleum Chemistry

Delivered before the California Natural Gasoline Association February 5, 1948 meeting, by Mr. David H. Conklin, Manager West Coast District, Petroleum Chemicals Division, E. I. du Pont de Nemours & Company.

By Dr. F. W. MILLER
E. I. du Pont de Nemours & Co.

Although the manufacture of chemicals from petroleum began only about 20 years ago, it is now a mammoth industry in its own right. Today hundreds of chemicals are being made industrially from petroleum hydrocarbons and minor amounts of such elements found in petroleum as nitrogen, sulfur, and oxygen.

In 1925, less than a tenth of one percent of the organic chemicals manufactured in the United States, actually about 150,000 pounds, came from petroleum sources. At that time there were only a handful of chemicals derived from petroleum—actually they were isperepyl alcohol and a few chlorinated hydrocarbons. Now there are over 5400 finished products made from petroleum and they range all the way from ash trays to Milady's silk-like garments.

In 1935, there was only one oil company classified as a chemical manufacturer. Now there are over fifty. In 1946, over 25 percent of all the organic chemicals manufactured, about 3.8 billion pounds, were derived from petroleum or natural gas sources.

Of course, you are all familiar with the impact that the fuel shortage is having on the petroleum industry. The time doesn't seem so far off when this country will get much of its petroleum products from the conversion of natural gas. As you know, two multi-million dollar plants—in southwestern Kansas and Brownsville, Texas—are being installed to change natural gas into synthetic petroleum products. By early 1950, 7000 to 8000 barrels of oil a day are expected to flow from the Kansas plant. Some 7000 barrels a day, chiefly gasoline, is the estimated output of the Texas plant.

These are the first two concrete steps toward the sweeping changes that are coming in the entire petroleum industry. It well may be that the next generation—perhaps even our own—will see this revolution expand to cover the whole fuel industry, not only gaseous and liquid, but solid as well.

That era is off on the horizon of the petroleum industry. But the beginning of the change-over will have a dramatic and immediate effect on the chemical industry. A revolution in production methods is already at the doorstep of many branches of chemical manufacture, and all of the industries that depend on chemical products will be affected.

The Texas and Kansas plants alone are expected to produce—in addition to fuels—over 150 million pounds of chemical products a year. These will include an inexpensive source for many alcohols—methyl, ethyl, propyl, butyl, and amyl, which, as you know, are important solvents and chemical intermediates. Acids, too, will come from the synthesis process—for example, acetic acid, necessary for the manufacture of cellulose acetate for rayon, photographic film, and plastics—also propionic acid, from which we get our "Mycoban" mold inhibitor for bread and other baked goods. Another chemical product connected with fuel synthesis will be acetone, and industrial solvent and a raw material used by the chemical industry for the manufacture of resins such as du Pont "Lucite" acrylic resin. Still another major product will be acetaldehyde.

Coming onto the market in large amounts, they will have an important effect on prices, help to open up new fields, and lead to the development of new plastics, solvents, pharmaceuticals and other products.

The future of the petroleum chemicals industry in the United States is indicated by the $340,000,000.00 investment that is being made in the installation of plants in the Texas Gulf area alone. Among these plants there are included those of the Carbide and Carbon Chemical Corporation, Celanese Corporation, Dow Chemical Company, du Pont, Monsanto, Rohm & Haas, and the Shell Chemical Company to mention only a portion of them.

As is well-known to all of you, however, the work of manufacturing chemicals from petroleum raw materials is well under way and expanding rapidly. Responsible executives believe that in 1948 the synthetic chemical industry in the United States is entering on its greatest year ever, as demands for chemical materials increase steadily and point to a record high in production and sales. Mr. W. Ward Jackson of the Celanese Corporation has canvassed the 1948 outlook for the production and sales of the more basic synthetic organic chemicals. Included in this group are some which are of major interest in various phases of the du Pont Company's activities—they are methanol, formaldehyde, acetone, acetic acid, acetaldehyde and butyl alcohol. Borrowing liberally from Mr. Jackson's figures in the Journal of Commerce (January 7, 1948), and adding some of our own, let's look at the magnitude of production of these chemicals, and indicate the source of the du Pont Company's interest in them.

One of the most important synthetic organic chemicals is methanol, used chiefly for the production of "Zerone" anti-rust anti-freeze, and for formaldehyde as well as in smaller quantities for the production of "Lucite" acrylic resin, as we will see.

It is estimated that approximately 80 million gallons of this alcohol were produced in the United States in 1947 and roughly half of this was

made from petroleum raw materials by a process that will be outlined shortly. Of this 80 million gallons, about 40 percent went into anti-freeze and another 40 percent into the production of formaldehyde. The remainder went into general solvent uses, synthesis and miscellaneous applications.

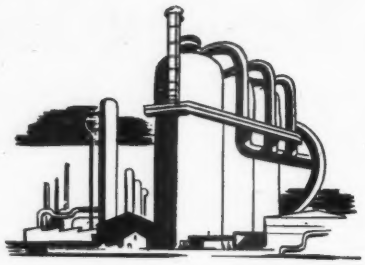
It is estimated that the total methanol production in 1948 will be about 110 million gallons and in 1950, 140 million gallons. In view of these increasing requirements, the du Pont Company is planning new facilities and increased production for 1948, a part of which will involve petroleum sources.

The method of producing methanol from petroleum products depends basically upon methane in natural gas. When methane is treated with steam in the presence of the proper catalyst under selected conditions, the resulting products are carbon monoxide and hydrogen, but unfortunately, these two gases are obtained in a volume ratio of 1 to 3, rather than in a 2 to 1 ratio that is necessary for the catalytic synthesis of methanol. There are several possibilities for adjusting this ratio but they would take too much time to discuss here.

The great increase in demand for formaldehyde resins accounts in large part for the unprecedented demands for methanol production. The production of formaldehyde decreased from 1943 through 1946, but in 1947 it reached a new record of 540 million pounds. The demand for formaldehyde is so high, and the situation so tight that several large users have gone into their own production of formaldehyde from methanol.

As was indicated earlier, formaldehyde is used in combination with urea, malamine and phenol to make a large variety of plastic materials in tremendous volume. Naturally, the heavy demand for methanol for formaldehyde has resulted in a shortage for other uses. Those of you who are here from the colder regions may have a direct personal appreciation of this from the difficulty you have had in purchasing methanol anti-freezes.

Another important chemical made from petroleum sources and used by the du Pont Company is acetone,



the production of which in 1947 was about 350 million pounds. Approximately 10 percent of the acetone produced still is made by fermentation, but the balance comes from petroleum sources, either by direct oxidation of petroleum natural gas or by treatment of propylene with water in the presence of a catalyst to form isopropanol. The latter is oxidized to form acetone, the chief chemical product made from propylene. But acetic anhydride, methyl isobutyl carbinol and methyl isobutyl ketone are also manufactured. The latter two are used as solvents in the finishes industry to compensate for the shortage of butanol.

We use acetone in substantial quantities in two different ways—(1) as a chemical raw material, and (2) as a solvent in the synthetic textile industry, where it is used to dissolve cellulose acetate in the preparation of rayon.

Our chemical application of acetone comes by the route of adding hydrogen cyanide to it to form acetone cyanohydrin. The latter on hydrolysis and esterification produces methyl methacrylate monomer, which is then polymerized to the beautiful plastic that we all know in the form of "Lucite" acrylic resin, that you see in a hundred forms around you every day. Combs, brushes, cigarette boxes, clocks, horn buttons, instrument panels, road guides and many other uses are familiar to all of you.

Let's now give some consideration to acetic acid, another extremely important product that is made from petroleum sources.

The acetic acid production during 1947 was about 380 million pounds. In spite of plant expansions which will probably boost the total annual output in 1948 by 20 million pounds, there is a possibility that textile demand in 1948 may make the acetic acid supply even more acute than it was in 1947.

About 75 percent of the acetic acid produced in the United States last year was made from petroleum raw material sources, and about three-fourths of the annual production of acetic acid went into cellulose acetate and acetic anhydride. Of the remainder, about 20 percent went into solvent esters and the remainder into chemical synthesis.

Acetic acid is made from ethylene by the addition of water in the presence of a catalyst to form ethyl alcohol. The latter is oxidized to form acetaldehyde which on further oxidation goes to acetic acid. The acetaldehyde may be converted directly to acetic anhydride, if desired—or the acetic anhydride may be made from acetic acid by dehydration. Both processes are in commercial operation.

Our 1947 figures for the consumption of ethylene, used in the manufacture of acetic acid, etc., are not complete but they are of the same order as the 1946 figures which show that approximately 400 million pounds of ethylene went into the manufacture of ethyl alcohol and 155 million pounds into ethylene clycol, the base for the so-called non-volatile anti-freezes. A very small but increasing factor in the ethylene market is its use in the manufacture of the relatively new plastic, polythene, the lightest of the commercial plastics. Polythene is made by the polymerization of ethylene under pressures between 10,000 and 20,000 pounds per square inch, and is soft, paraffin-like and tough. It is widely used as an electrical insulator. For example, in the television industry, coaxial cables are insulated with polythene. You may be more familiar with this tough, flexible material in the form of raincoats, shower curtains, garment bags, bowl covers, floating toys, tumblers, soap dishes, ice cube trays and wristwatch straps.

In discussing the manufacture of acetic acid and the acid anhydride, we mentioned the production of acetaldehyde from ethylene via ethel alcohol. If the acetaldehyde is catalytically dehydrated and hydrogenated, butyl alcohol is formed. In 1947, the production of this alcohol from all sources was about 140 million pounds, half of which came

(Continued on Page 17)

Control of Narrow Boiling Range Fractionating Columns

By G. G. GALLAGHER
Universal Oil Products Company
Chicago, Illinois

Present day petroleum refining practices are working toward a higher and higher degree of separation of the narrow boiling range hydrocarbons; hence more accurate and more direct methods of instrumentation and control are required.

The usual means of temperature and pressure control, long used on ordinary fractionating columns are not adequate for the super fractionators now encountered.

Figure 1 shows a deisobutanizing column which fractionates isobutane from normal butane.

At 110 psi. column pressure, there is only 23°F. difference between the boiling point of pure isobutane and that of pure normal butane. On this basis a change of only 1.0°F. in column temperature will cause a change in composition of approximately 4%. From this it can be seen that the accuracy required is hardly possible with present day temperature controllers. Even then, holding the temperature alone constant will not suffice since the purity of the product overhead may also vary in the order of 2 to 3% with a change in pressure as small as 1.0 psi. Changes in barometric pressure alone can be responsible for variations of several per cent in the purity of the overhead material.

From this it can be seen that it is important to maintain **both** pressure and temperature within very close limits. Since temperature and pressure controllers with the required accuracy were not available, a search was made for a better method of control. What was most desired was a composition controller that would make the necessary adjustments to the process for variation in column temperature ,pressure, feed composition or feed quantity.

One method which has been developed for controlling such narrow boiling range columns is commonly known as a vapor pressure controller, although on strictly **binary** columns it is essentially a **composition controller.** This instrument consists of a temperature bulb and pressure connection, both being located at the same point in the column (Figures 2 and 3). The temperature bulb is partly filled with one of the materials being fractionated. This bulb when exposed to the column temperature will exert a vapor pressure against one side of the diaphragm or mercury U tube, the other side of which is opposed by the pressure of the column taken at the same point that the temperature sensitive bulb is located. Whenever the material at this point in the column is of the same composition of that in the bulb, no differential on the instrument will exist regardless of what presssure or temperature elevation is encountered. Conversely, by holding a zero differential pressure on the vapor pressure controller the composition on the tray will always be the same as that in the bulb.

By looking at curves on Figure 4 it can be seen that with a constant differential on the vapor pressure controller very little change in composition is encountered even with wide changes in column pressure. In other words, with a 1.0 psi. change in column pressure, the composition will only change 0.4% instead of the 2 to 3% encountered when using a temperature controller and assuming it holds the temperature perfect. Therefore, it may be said that this instrument can control composition within very close limits by controlling the differential pressure between the column and the bulb.

Although this method of control is satisfactory for binary columns,

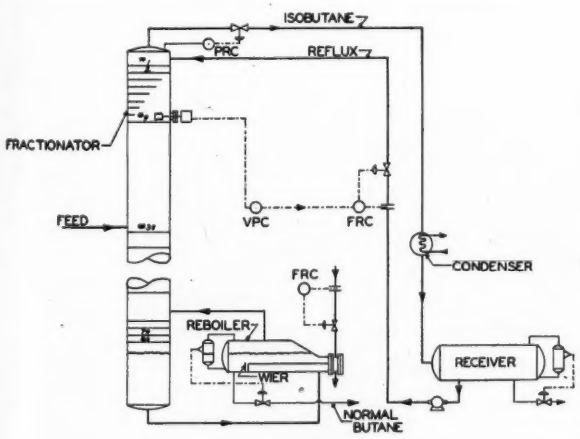


FIGURE 1.

DEISOBUTANIZING COLUMN WHICH FRACTIONATES ISOBUTANE FROM NORMAL BUTANE.

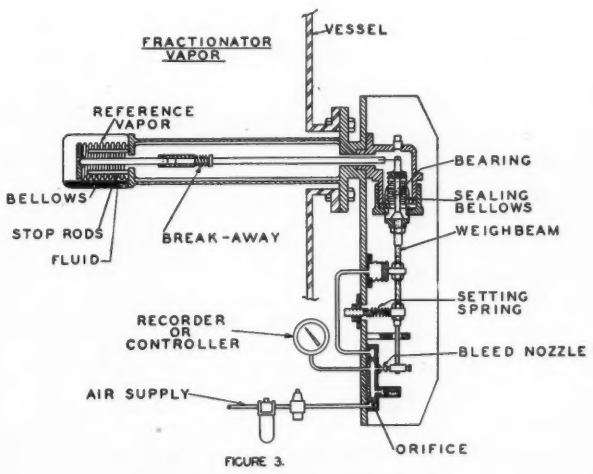
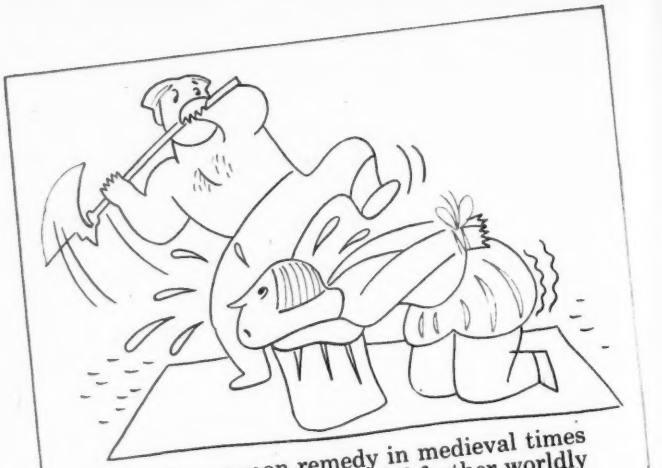


FIGURE 3.

A VAPOR PRESSURE TRANSMITTER

the Headache remedy...

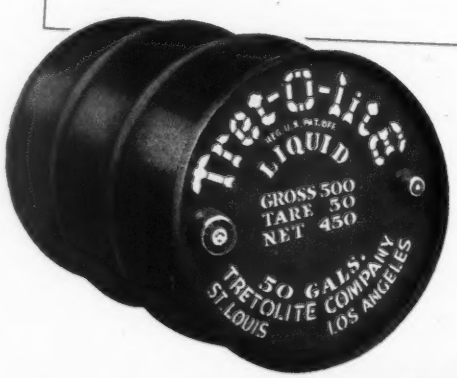


A fairly common remedy in medieval times removed the ache, head, and further worldly worries. Certain persons, whose activities caused crowned heads to ache, lost their own as a result.

Remedies from the dark continent are still being brewed daily from bat brains and orchid petals. In case of an ineffectual batch, the kettle is still handy for an extended liquid hot-foot.

There are available today various pate pain panaceas which, if they don't cure, will at least amuse by fizzing, foaming or dissolving rapidly

The big red barrel holds the all time record as a sure cure for emulsion headaches. This remedy is available in every oil field. Tret-O-Lite effectiveness, and the efficiency, skill and experience of the entire Tretolite organization are always available,–just telephone



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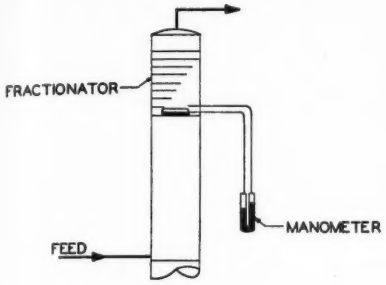

FIGURE 2

VAPOR PRESSURE BALANCE

its use in columns of multi-component mixtures is somewhat limited and the limitations have not as yet been fully explored.

The petroleum and chemical industries have developed needs for new and revolutionary type instruments faster than the instrument industry was geared to keep in step. Several years after development of

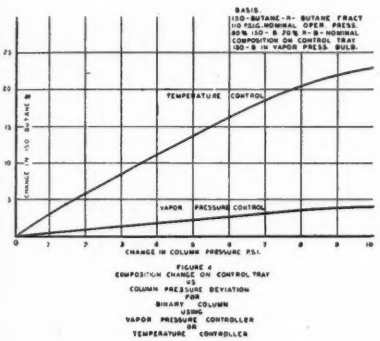

FIGURE 4
COMPOSITION CHANGE ON CONTROL TRAY VS. COLUMN PRESSURE DEVIATION FOR BINARY COLUMN USING VAPOR PRESSURE CONTROLLER OR TEMPERATURE CONTROLLER

the need for a better means of controlling the multi-component columns, undesirable indirect methods of control are still being used because a satisfactory direct composition controller was unavailable. This is a definite challenge to the instrument industry to intensify its research and development along these lines.

Developments in Petroleum Chemicals

(Continued on Page 14)

from petroleum sources. Normal butyl alcohol and isopropyl alcohol, made from petroleum propylene, are solvents for "Duco" lacquers. Butyl alcohol is also used in combination with phthalic anhydride to form dibutyl phthalate, a plasticizer for our nitrocellulose lacquers.

Phthalic anhydride is an essential intermediate in the manufacture of alkyd resin finishes such as "Dulux". On the West Coast, ortho-xylene from petroleum is being oxidized to phthalic anhydride. This process was just recently put into commercial practice. The first plant is producing about eight million pounds a year. Continuing demands for phthalic anhydride will undoubtedly lead to increased production because of the shortage of naphthalene from coal tar, the former basic material for this chemical.

Closely related to ortho-xylene is toluene which is being produced in increasing quantities from petroleum sources, and is rapidly overtaking and passing the older source of supply which again is coal tar. Our figures for 1947 are not complete but in 1946 there were 34 million gallons of toluene produced in the United States and 55 percent of this was supplied by the petroleum industry. Of course, this 34 million gallons represents a big drop from the figure of 132 million gallons in 1945, but that merely reflects the end of the war because toluene is the base chemical for the manufacture of T.N.T. Leaving aside any consideration of wartime applications, T.N.T. is an important ingredient of the priming mixtures used to set off du Pont's "Nitramon" blasting agent, an explosive widely used in quarrying, coal stripping and seismic blasting. T.N.T. as you all know, is manufactured by the nitration of toluene in the presence of sulfuric acid.

Petroleum hydrocarbons also are being used in increasing quantities in paints and lacquers.

We have all become familiar with the popular statement that nylon is made from coal, air and water, but it is probable that that statement will have to be modified shortly as nylon intermediates from natural gas as well as petroleum sources come into the picture. It is anticipated that before long natural gas as well as petroleum will be used in the manufacture of adipic acid and hexamethylene diamine, the two compounds that make up nylon salt. We hope to have more specific statements to make soon, about the application of petroleum products to nylon manufacture.

Dydrogen is needed to make both adipic acid and hexamethylene diamine. Natural gas is a good source of this element, and is also suitable for use as a fuel for some of the manufacturing processes.

In making the adipic acid, cyclohexane is used. At present, this is coming from a coal tar product, benzene, by the addition of hydrogen to the molecule. But cyclehexane is a naturally occurring component of petroleum, and it is expected that eventually it will play an important part in the nylon picture.

Cyclohexane constitutes from less than one to more than four percent of the lighter distillate—the naphtha fraction—depending on the source of the crude petroleum. But it has to be separated out in relatively pure form for adipic acid manufacture.

Once the adipic acid is obtained, part of it is used in making the other half of the nylon salt combination, hexamethylene diamine. Here ammonia is required, and more hydrogen. The ammonia itself is made from nitrogen and hydrogen through a high-pressure nitrogen fixation process. The hydrogen may come from either natural gas or steam, and the nitrogen from the air.

Finally the adipic acid and hexamethylene diamine are united to give the salt from which nylon yarn, bristles and plastics are made. It is unnecessary for us to tell you anything about nylon because you are all familiar with the terrific impact that it has had on the American way of life.

In the time allotted, we have been able to outline very briefly the major points at which the natural gasoline-gas industry and the interests of chemical manufacturers coincide. Considering the wide variety of products we make, there are obviously many other points of contact, not the least of which is the fact that we manufacture numerous chemicals that are used to enhance the utility of petroleum automotive products. The brief outline we have given, however, is a strong indication of what the future holds in the direction of a greater community of interests between the petroleum and chemical industries.

HERE IS THE SOLUTION OF A DIFFICULT

It has always been difficult to perform a successful cement job at some desired point above the bottom of the hole — and at the same time prevent contamination by the cement slurry of permeable, low-pressure zones below the cementing point.

This operation is now safely and efficiently performed by using the Baker Triplex Cementing Shoe (Product No. 136) or the Baker Triplex Cementing Collar (Product No. 138) which is similar in internal construction and in operation to the Triplex Shoe.

The simple operation of TRIPLEX Equipment is evident from the accompanying drawings which illustrate the ease of floating-in casing strings of any size or length — the efficient distribution of the cement slurry — and the protection of permeable, low-pressure zones below.

Get in touch with the Baker representative in your area for prompt, helpful service.

BAKER OIL TOOLS, INC.

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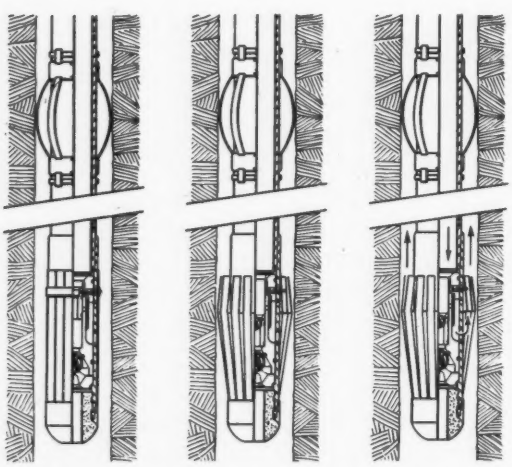
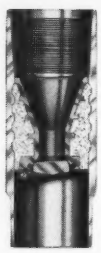
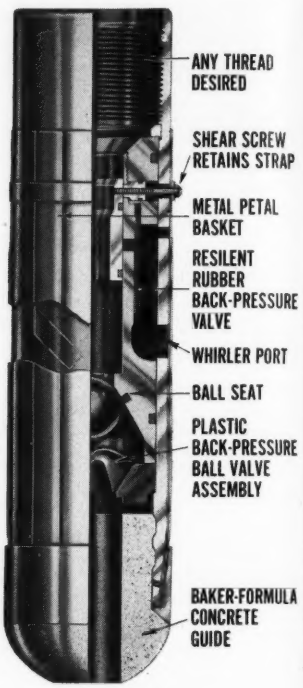


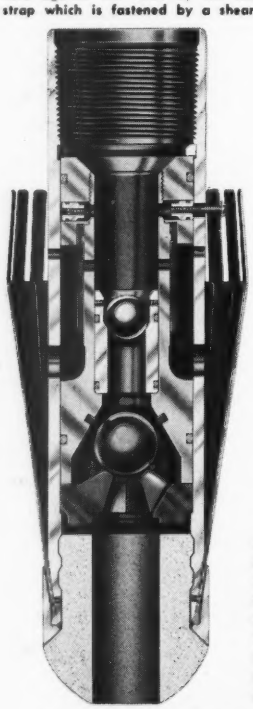
The Baker Triplex Cementing Shoe (left) in running-in position, centered in the hole by a Baker Casing Centralizer. In the center illustration the Tripping Ball has been dropped, seated, and the Tripping Valve forced downward. This action shears the shear screw holding the Metal Petal Basket against the Shoe, and permits the Metal Petal Basket to expand against the side walls of the hole. The ports are now open ready for cementing. At right, cementing is under way, with the slurry directed upward to completely encase the centered pipe with a uniformly thick body of cement with the expanded Basket retaining the cement *above* the Shoe.



The Baker Triplex Flapper Valve Float Collar (Product No. 134) may be run in place of the Triplex Baffle Collar when an additional float valve is desired. Note how it is designed to permit passage of the Tripping Ball, and how an ample flat surface is provided for "bumping" the cementing plug.

At right the Triplex Shoe is shown in running-in position, with the Metal Petal Basket held against the Shoe by the hold-down strap which is fastened by a shear screw.

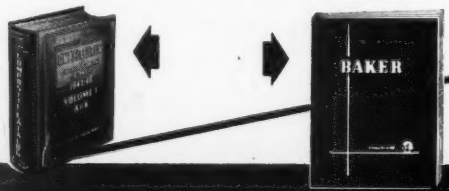




The Triplex Cement Baffle Collar (Product No. 137) is run a joint or two above the Shoe and serves as a stop for the cementing plug, so that mud-contaminated cement is retained inside of the casing. The hole is bevelled at its top to permit easy passage of the Tripping Ball.

(Left) The Tripping Ball has been dropped and seated on top of the Tripping Valve. Pressure of about 500 psi has sheared the shear screws and forced the Tripping Valve down to expose the cementing ports. Shearing the screws also permits the Metal Petal Basket to expand against the side walls and form a bridge which holds the cement slurry *above* the Triplex Shoe and protects permeable, low-pressure zones below from cement contamination.

Complete details are in the 1948 Baker Catalog — and THE COMPOSITE CATALOG



BAKER TRIPLEX CEMENTING EQUIPMENT

Overcoming Lost Circulation

(Continued from Page 11)

plugging agents such as cotton seed hulls, cotton bolls, beet pulp, bran, etc., failed to correct the condition of lost circulation; but when semi-bridging or bridging agents were added, circulation was quickly recovered. Failure, or short life of the corrected condition, when organic materials are used, may be caused by decomposition of these materials by fermentation. All of the naturally-occurring organic materials mentioned above contain sugars and starches which are readily attacked by micro-organisms. By a special manufacturing process, sugars and starches are removed from the manufactured material mentioned above.

One commonly used bridging material is sized flake mica prepared ready to add to the mud system through the conventional hopper. The flat flakes of this material tend to orient themselves so that they lie flat against the face of the bore hole. The resulting structure might be compared to shingles on a roof. The comparatively large surface of the flake closes or bridges the channels which are taking mud. The mica is chemically inert in mud and does not absorb moisture from the mud. Experience has shown that after returns are restored with the mica material, the mud weight can be raised appreciably.

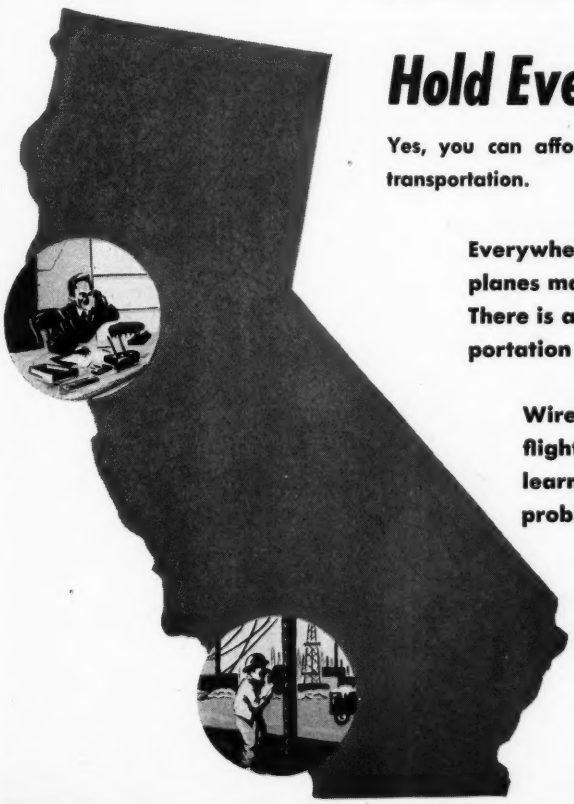
Probably the most satisfactory admixture of mud for curing this type of lost returns is one consisting of a good base mud to which is added both fibers and flake mica. In this way advantage is taken of the formation of the mat of fibers, the bridging of the mat and channels with mica, and the subsequent deposition of a thin flexible filter cake.

Use of Cement

In discussing the various types of lost circulation, no implication is made that any particular instance of lost circulation can be placed in one type only. Many cases will resemble more than one type and then parts of both treatments may be necessary.

If the plugging or bridging agents fail to correct the condition, then gel-cement or a quick set cement may be used. The quick-set special cements, however, exhibit the flat, pancake-like disc characteristic of neat cement; that is, a mix having a low angle of repose and one that may flow into the formation, giving a resulting plug in only a few of the lowermost channels. Setting time of these cements is usually affected by the mixing water used. This variation in setting time demands careful supervision to prevent plugged drill pipe.

Experience has shown that gel-cement will seal off effectively formations of high porosity and permeability and fractured and fissured strata that cannot be prevented from taking fluid by plugging and bridging agents. Moreover, once lost circulation is regained by proper placement of gel-cement it will not be lost again under changing pressure conditions. This type of cement is made by the addition of a small amount of prepared bentonite to any kind of portland cement, the mix for this kind of formation causing low-pressure losses usually being 6 to 8 lb. of the bentonite per sack of cement with an 8.5 to 10 gal. per sack water-cement ratio. This gel-cement has a number of properties that are invaluable in severe cases of lost circulation, chief



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PATTERSON-BALLAGH

Bottom-Type Mud Gun

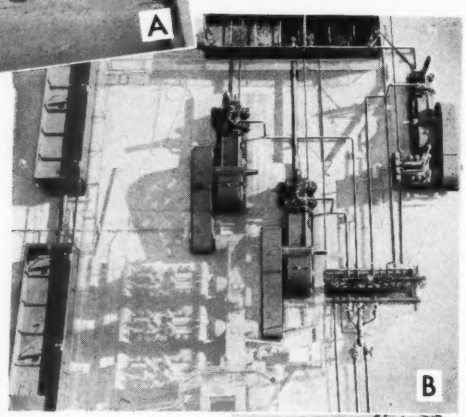
BIG AID IN UNITIZED MUD SYSTEM

Fred M. Manning's Coastal Drilling Co. uses the Patterson-Ballagh Bottom-Type Mud Gun to great advantage in a unique mud system on their big rig, now operating in San Emedio, California. This rig is outstanding for its neat layout and efficiency of operation.

(A) *Patterson-Ballagh Bottom-Type Mud Guns in Settling Tanks.*

(B) *Arrangement of the three Mud Tanks and Slush Pumps.*

(C) *General view of Fred M. Manning's Coastal Drilling Co. Rig at San Emedio, Calif.*



☆ The mud system on this rig is highly interesting and effective, giving the operator quick control of the entire system through a unitized manifold. This unique arrangement makes possible perfect control of the mud at all times, and assures an adequate supply of mud under all deep drilling conditions. Mud, returning from the well, first passes over twin sand shakers and then through three large steel settling tanks. Mud is taken from the third tank by any one or all of three mud pumps and delivered to the manifold. Three main pressure lines run from the pumps to this manifold, where three main control valves divert the mud either back to the tanks or to the stand pipe. The remaining portion of the manifold includes the valves necessary to control the flow of mud back into the settling tanks, which are all equipped with Patterson-Ballagh Bottom-Type Mud Guns. Each of these guns jets the mud into the tank car near the bottom through a regular Patterson-Ballagh Bottom Type Mud Gun. The swivel on the gun permits direction of the jet to be controlled, and stirs the settled weight material back into the mud mixture as desired. *See page 3473 of 1948 Composite Catalog for complete description of Mud Guns and then*

Specify

PATTERSON-BALLAGH

DIVISION OF BYRON JACKSON CO.

BOTTOM-TYPE MUD GUNS

Main Office:
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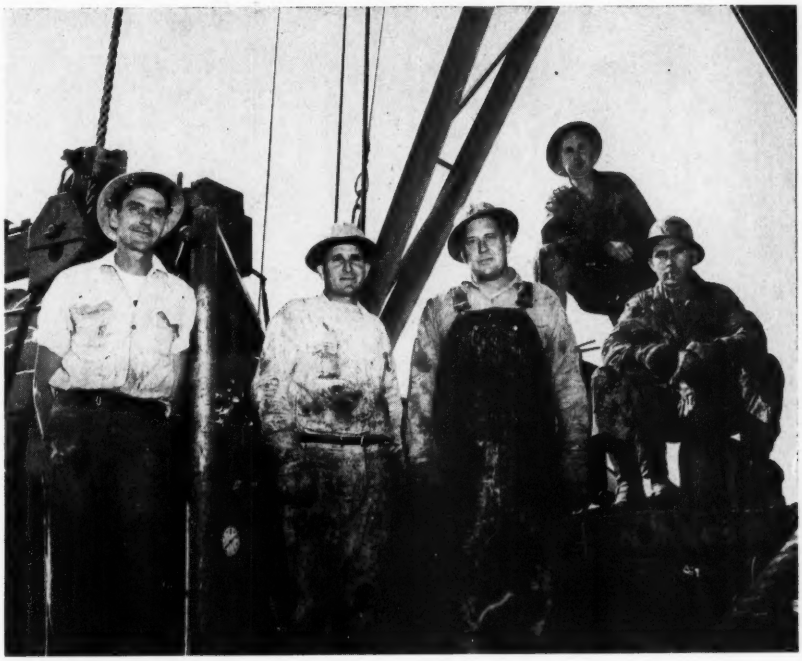
among which being the high angle of repose.

The cement is placed in the hole through the drill pipe, the drill pipe is withdrawn and the cement is allowed to set. The resulting plug is then drilled out and, if no loss occurs, drilling is resumed. If some loss still takes place, the cementing is repeated. The original zone of lost returns may be healed but returns may again be lost when more hole is made. This condition, of course, calls for a repetition of the above procedure.

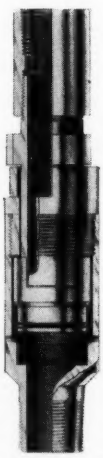
One of the factors least understood or taken into account when cementing to cure lost returns is the necessity for maintaining the hydrostatic equilibrium existing between the formation pressure and the mud column in the hole. When returns are lost the mud in the hole will fall to a certain distance from the surface. This distance is the point of equilibrium for a mud of that weight. If more of the same mud is added at the surface, the column will seek the same level, which means that the mud in the bottom of the hole migrates into the formation. When the level of mud in the hole is lowered by withdrawing the drill pipe (4½-in. OD, 18.10-lb. drill pipe displaces approximately 0.65 bbl. of mud per 100 feet), fluid flows from the formation into the hole until equilibrium is reestablished. It can be seen then that if, after placement of cement,



Richfield Oil Corp.'s Vail No. 4, located in East Los Angeles near U.S. Rubber Co. plant. Rocky Mountain Drilling Co., contractors, left to right: Virgil Badberg, derrick; Pat Patterson, driller; M. M. Kennedy, cathead; H. F. Minion and Bill Kelly rotary helpers.

THIS PAGE TUBING DRAIN GIVES YOU TWO TOOLS IN ONE!

It's A Tubing Drain—It's A Bumper Sub



PAGE TUBING DRAIN IN DRAINING POSITION

HERE'S A COMBINATION production tool that gives you both an efficient tubing drain and an effective up-jar Bumper Sub—whichever you desire at any given moment. Run in immediately above the tubing anchor or packer, this Page Combination Tubing Drain and Bumper Sub can be actuated by simple top hole manipulation of the tubing string. Here's how it operates:

TO DRAIN TUBING you need only lower the tubing string slightly, introduce a small amount of right hand torque and pick up. This places the sealing ring above the drain ports for full drainage of fluid.

TO JAR TUBING you lower the tubing string and turn left to take up the slack, then pick up 5 or 6 points and turn right until jarring action is felt. You can repeat as many times as necessary!

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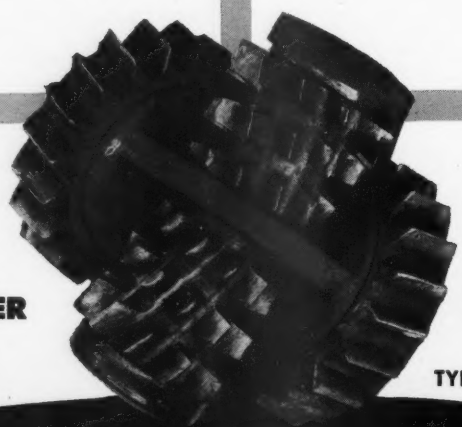

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TYPE E-2E

H C Smith Oil Tool Co.

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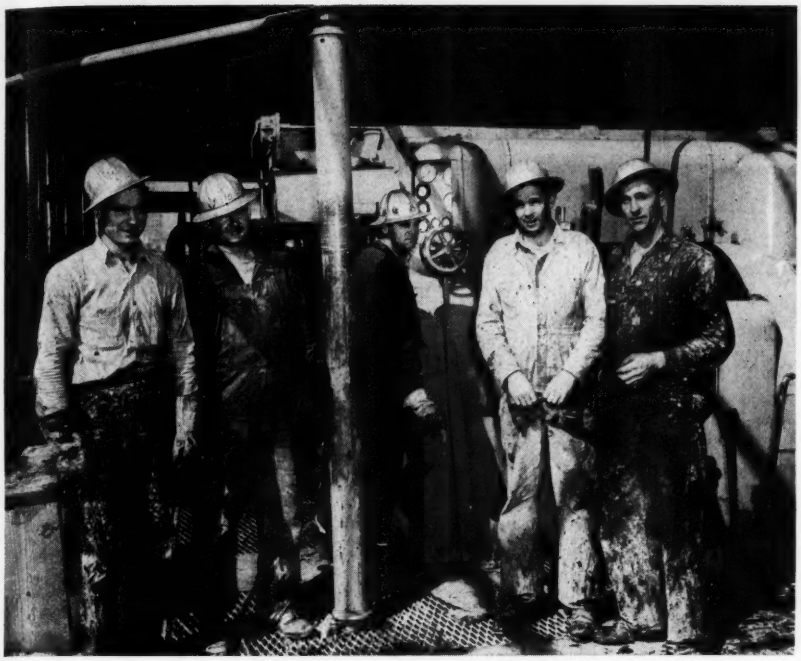

Tom Pike Drilling Co., contractors for Edwin W. Pauley's Stewart-Pacific Tube Lease, located in East Los Angeles at Gasper Ave. and Smithway St., left to right: C. J. Toliver, rotary helper; J. C. Reed, derrickman; Lee Gailey, driller; R. L. Smith, pipe racker; F. E. Wylie, rotary helper.

any considerable amount of pipe is withdrawn without adding mud at the surface to compensate for the volume of the pipe, the cement may be forced back up the hole above the section of lost returns. Likewise, if too great a volume of mud is added while withdrawing the drill pipe the cement may be forced out into the formation beyond the point at which it is effective. If control cannot be effected, then use of a comparatively large volume of cement is indicated, in which case some of the cement should be forced by pressure into the formation and a considerable column of cement left in the hole to be drilled out after setting. The main objection to leaving any considerable column of cement in the hole is the possibility of side tracking the hole when drilling out.

Lowering of the Hydrostatic Head

The use of gel, plugging and bridging agents and cement gives positive results. If low formation pressures only are known to exist, or if casing is to be set before pressures are encountered, returns are sometimes established by lowering the hydrostatic head imposed upon the formation. This can be done in one or both of two ways: first, by lowering the specific gravity (unit weight) of the mud; and, second, by lowering the pump pressure. The possibility of success of these measures can be calculated in the following manner. Locate first the depth to which the mud column falls. This can be done with a measuring line to which a float is attached or by running drill pipe in the hole and measuring the dry part of the pipe as it is withdrawn. Then calculate the hydrostatic pressure of the mud column remaining in the hole. Apply this figure to a column extending to the surface. This gives an answer equivalent to a column in equilibrium with the formation pressure but does not take into account the pump pressure exerted on the formation or the friction to be overcome in moving the mud column, so the actual weight of the mud should be reduced somewhat below the answer obtained by calculation.

Lowering of pump pressure is accomplished by reducing the volume of mud pumped. This reduction has practical limits because the velocity in the annular space must be sufficient to raise the cuttings out of the hole. It must also be remembered that reduction of pump pressure as measured at the surface is not equivalent to the reduction obtained at the bit. This is true because most of the pressure is used in overcoming the frictional resistance offered to movement of mud through the drill pipe. Due to the wide variation of viscosity and gel characteristics of different muds, this value would be difficult to calculate. The best way to determine the effect of lower pump pressures is by trial in the well.

Concluded in 1st March Issue

Richfield Oil Corp.'s U.S. Rubber No. 1, located in East Los Angeles near U.S. Rubber Co. plant, Rocky Mountain Drilling Co., contractors, l. to r.: Cecil Campbell, cathead; C. V. Arnold, floorman, A. H. Powell, driller; Jay Kimberger, derrick; Bill Brown, floorman.

SAFE, SURE Liner Suspension with the BOWEN LINER HANGER

Bowen Pack-Off Type Liner Hanger

THERE are a dozen ways to go wrong when completing a well—and one of the easiest is to install the liner *without proper attention to the method you use.* A badly set liner may collapse or sag. It may break or shift. Or it may stick when later attempts are made to remove it . . .

The answer, *SUSPEND your liners from the casing string with a Bowen Liner Hanger!* It is the safe, sure method of protecting against common liner troubles. A Bowen Liner Hanger is easy to set . . . easy to remove whenever required . . . and gives positive liner suspension in the well. What's more Bowen Hangers are available in special types to provide the advantages of liner *suspension* even on tough completion jobs . . .

For example: Bowen Liner Hangers are made in standard plain and pack-off types, as illustrated, for ordinary liner jobs. But—they are also available in:

1. —**Hydraulically-set Types** which operate **entirely without rotation** and give positive evidence at the surface that the liner is suspended in the well. Hydraulically-set Hangers permit hanging liners in slant or crooked holes . . . installing pre-packed gravel liners . . . hanging liners which must pass through a casing window . . . hanging liners that are exceptionally short or light in weight. In fact, wherever liner rotation is not desirable, Bowen has the Hydraulically-set Hanger for the job!

2. —**Special Hangers** designed for hard-to-set liners. Operators may find it necessary to rotate liners severely and work them up and down in order to locate them properly. For this, Bowen has developed special adapters and landing tools for use with the regular Hangers which permit safe, positive liner suspension under these conditions.

Bowen Hydraulically-set Liner Hanger

THE IDEAL LANDING TOOL for use with the Bowen Liner Hanger is the Bowen Releasing Spear. It is simple to operate and ruggedly built for all conditions of liner installation, and will "take" the full pulling capacity of the run-in string. It can be equipped with a stop collar for bumping down through tight spots . . . and can be used with jars for loosening stuck liners. Universally adaptable for all liner jobs. Ask for complete details!

Your nearest Bowen Field Store stocks the Bowen Liner Hanger in a complete range of sizes and types for any completion job, and full details on this valuable production tool are yours for the asking. **Call Bowen—day or night—at any of five convenient service stores in active California fields! Or write for the Bowen Catalog!**

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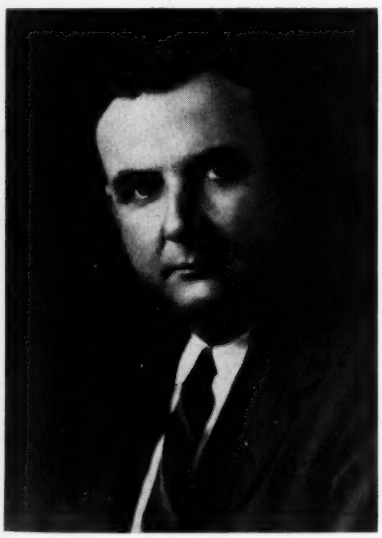
Personalities IN THE NEWS

Walter W. Trout Heads Lufkin

Walter W. Trout was elected President of the Lufkin Foundry and Machine Company, manufacturers of oil field pumping equipment, at the annual meeting of the Board of Directors in January. Trout, who has been with the Company 23 years, beginning as a machinist in 1925, succeeds his father, the late W. C. Trout, who had headed the Foundry since its start early in the century. Walter Trout has been vice-president and general manager of the Foundry, and since the death of his father in April, 1947, has been acting head of the giant Lufkin industry.



Walter W. Trout

Mr. Trout is a graduate of Purdue University and attended Rice Institute and the University of Texas.

W. D. Winston, Jr., who has been with the Company 34 years, was elected to the Board of Directors, to fill the vacancy left by the death of W. C. Trout. All other officers and directors were reelected.

Vice-presidents are J. H. Kurth, Jr., Houston; E. P. Trout, Lufkin; A. E. Cudlipp, Lufkin; and L. A. Little, Dallas. Winston was re-elected Secretary and E. H. Bounds was renamed Treasurer.

The Board of Directors includes Walter Trout, J. H. Kurth, Jr., E. L. Kurth of Lufkin, L. A. Little, S. W. Henderson, Jr. of Lufkin, Eli Weiner of Dallas, A. E. Cudlipp, Jacques Wiener of Shreveport, and W. D. Winston.

Thomas Lipps, oil company executive, and Mrs. Rachelle M. Gowland, were married by Judge A. Stutsman in his Los Angeles City Hall chambers. After the ceremony, the couple left for a honeymoon at Lipps' Two Bunch Palm Ranch at Desert Hot Springs.

Clifford B. Limbocker, 54, a director of Hancock Oil Co., died of pneumonia at a Long Beach Hospital. A native of Kansas, he had been with Hancock for 24 years.

The wide smile being worn these days by Elwood Holt of the Southern California Gas Co. compressor station at Taft is due to his recent engagement to Mary Ann McNinch. Mary Ann and Elwood have set their wedding for the proverbial June.

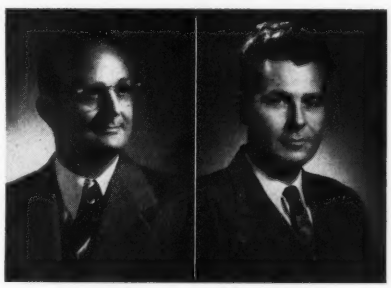
Arthur M. Flint, industrial relations and personnel department of Shell Oil Co. at San Francisco, in a recent game of cribbage with friends held a perfect hand of three fives, a jack and the five of the same suit as the jack on the cut, counting 29.

Russ Havenstrite was amongst Los Angeles oil men in attendance at New Orleans' famed Mardi Gras. He piloted his own plane to the Crescent City.

Raymond I. Mahan Heads New Corporation

The formation of Petroleum Rubber Corp., to handle the sale and installation of drill pipe protectors and stabilizers was announced recently by Raymond I. Mahan, President of the corporation. The new organization will operate under the Lester Ballard patents and will employ the equipment and methods which Ballard has used in the Avenal-Bakersfield area for the past two years. The company, whose headquarters are at 904 Security Building, Long Beach, California, is now operating in all major oil centers in California and will begin operations this spring in the Rocky Mountain, Mid-Continent and Gulf Coast regions.

Arrangements have been made with Los Angeles Standard Rubber, Inc., to manufacture the rubber protectors and stabilizers that will be used by the company.



Dr. Mahan **Karl Mercer**

Dr. Mahan comes to Petroleum Rubber Corp., with a broad background of petroleum experience. He attended the University of Texas where he spent a number of years doing research work on petroleum problems; on completion of this work he received a Ph. D. degree in chemistry and chemical engineering. After graduation, he joined the Research Department of Union Oil Co., later working in the distribution and marketing departments.

SPANG EXTREME LINE CASING *has* HIGH JOINT STRENGTH

● Satisfied users everywhere will tell you that Spang Extreme Line Casing Joints are ruggedly constructed to resist the terrific punishment encountered in deep wells. This unusual strength results from improved design that included specially modified Acme threads with steep flank angles to guarantee a tight, efficient interlock.

But, this is only one of many outstanding advantages found in Spang Extreme Line Casing. Spang Extreme Line can be run faster than any other type. It provides positive resistance to leakage. And the streamlined joint permits use of a larger final casing size and reduces friction in running in and out of hole.

Because of these valuable features you'll find Spang Extreme Line Casing used in many of the world's deepest fields. Specify Spang and you'll benefit from the multiple advantages of increased speed, rugged dependability and longer casing life. Write us for complete details or contact your nearby National Supply Store for expert help and immediate service on all your casing problems.

SPANG EXTREME LINE CASING

has 8 distinct advantages

1. High Joint Strength.
2. Positive Resistance to Leakage.
3. Minimum Outside Diameter at Joint.
4. Maximum Speed in Running.
5. Streamlined Exterior Contour.
6. High Resistance to Damage.
7. *Internal Flush Joint.
8. 50% less threaded connections than A.P.I. Casing.

*All but lightest weights of a size will pass the A.P.I. drift.

SPANG-CHALFANT

DIVISION OF THE NATIONAL SUPPLY COMPANY
EXECUTIVE OFFICE: PITTSBURGH, PA.

DISTRICT SALES OFFICES: ATLANTA; BOSTON; CHICAGO; DENVER; DETROIT; HOUSTON; LOS ANGELES; NEW YORK; PHILADELPHIA; PITTSBURGH; ST. LOUIS; SAN FRANCISCO; TULSA

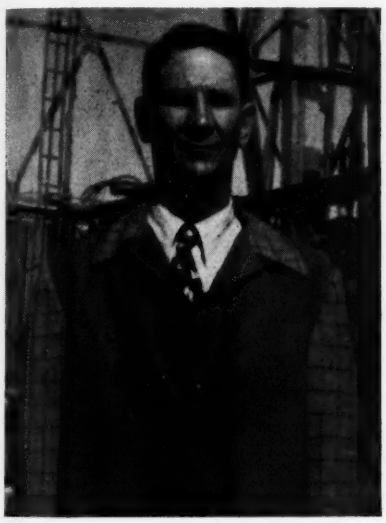
THE INDUSTRY'S MOST COMPLETE LINE OF OIL FIELD EQUIPMENT

Prior to accepting his present position, he was in charge of Union's Spokane district.

The field operations of the company will be directed by Karl M. Mercer, who has been appointed Field Superintendent. Mr. Mercer was formerly with Sperry-Sun Well Surveying Co.

Fortine Named Chief Geologist for Barnsdall

Dwight H. Fortine, former field petroleum engineer for Barnsdall Oil Company, in California, became chief California geologist for the company on February 1, succeeding R. T. White, who has resigned to enter business for himself.



Dwight H. Fortine

Mr. Fortine, son of F. A. Fortine, who was vice president and general superintendent for Barnsdall at the time of his death, has had a varied career in geology and petroleum engineering since his graduation from Stanford University in 1926. After a short period with the State Division of Oil and Gas, he became a petroleum engineer with the Miley Exploration Company, which was active at Goleta, Huntington Beach, and Signal Hill. He then went with Caribbean Petroleum Company in Venezuela, and was stationed at Maracaibo, and the Lagunillas, Mene Grande, and El Cubo fields.

After three years in Venezuela, Mr. Fortine returned to California in 1931, joining Barnsdall, for whom he has been a production engineer and petroleum engineer. His duties have covered Barnsdall operations in Rosecrans, Elwood, Gato Ridge and Newhall-Potrero.

He is a member of the A.I.M.E., and A.A.P.G., and has been active on A.P.I. committees on production practice, drilling practice and vocational education.

He is married and has two sons.

Braving the ice, snow and zero temperatures along the Atlantic seaboard, W. H. (Bill) Geis has left Los Angeles for a business trip to New York City.

S. B. Mosher, president of Signal Oil & Gas Co., A. C. Mattei, president of Honolulu Oil Corp., R. G. Follis, vice chairman of the board of Standard of California, and E. E. Pyles, assistant to the vice president of Jergins Oil Co. gathered recently in Washington for a meeting of the National Petroleum Council. Interior Secretary Krug has appointed William H. Keck Jr., vice president of Superior Oil Co. to the council.

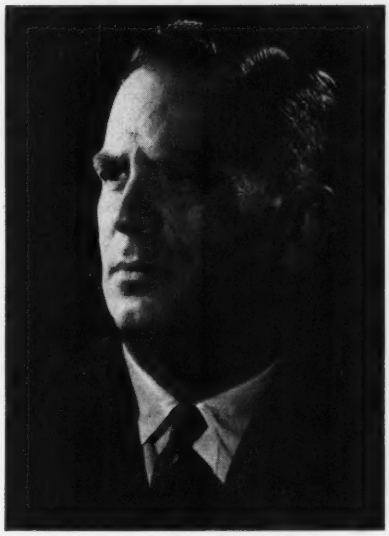
Tide Water Associated Oil Co.'s Sacramento district, directed by E. V. Black, sales manager, has won the 1947 Pacific Coast sales contest sponsored by the company in six Western states and Hawaii.

Edwin W. Pauley, Los Angeles oil man, has resigned as special assistant to Secretary of the Army Royall. Pauley was appointed last September as a special consultant on problems of procurement supplies and on plans for industrial mobilization.

"Geology of the Dominguez Oil Field" was discussed by Al Woodward at the geological forum, Pacific Coast section, American Association of Petroleum Geologists, meeting at U.S.C. "Aspects of the Geology of Portugal" was the subject of an address by Clive Mendelsohn.

Merchants Petroleum Co. at a special meeting in Los Angeles of the board elected directors to serve for the ensuing year.

Those named included H. W. Kortlander, president of the company; Kennedy Hamill, vice president; S. P. Mullen, secretary-treasurer and general manager; Clayton Severns and Robin Willis.



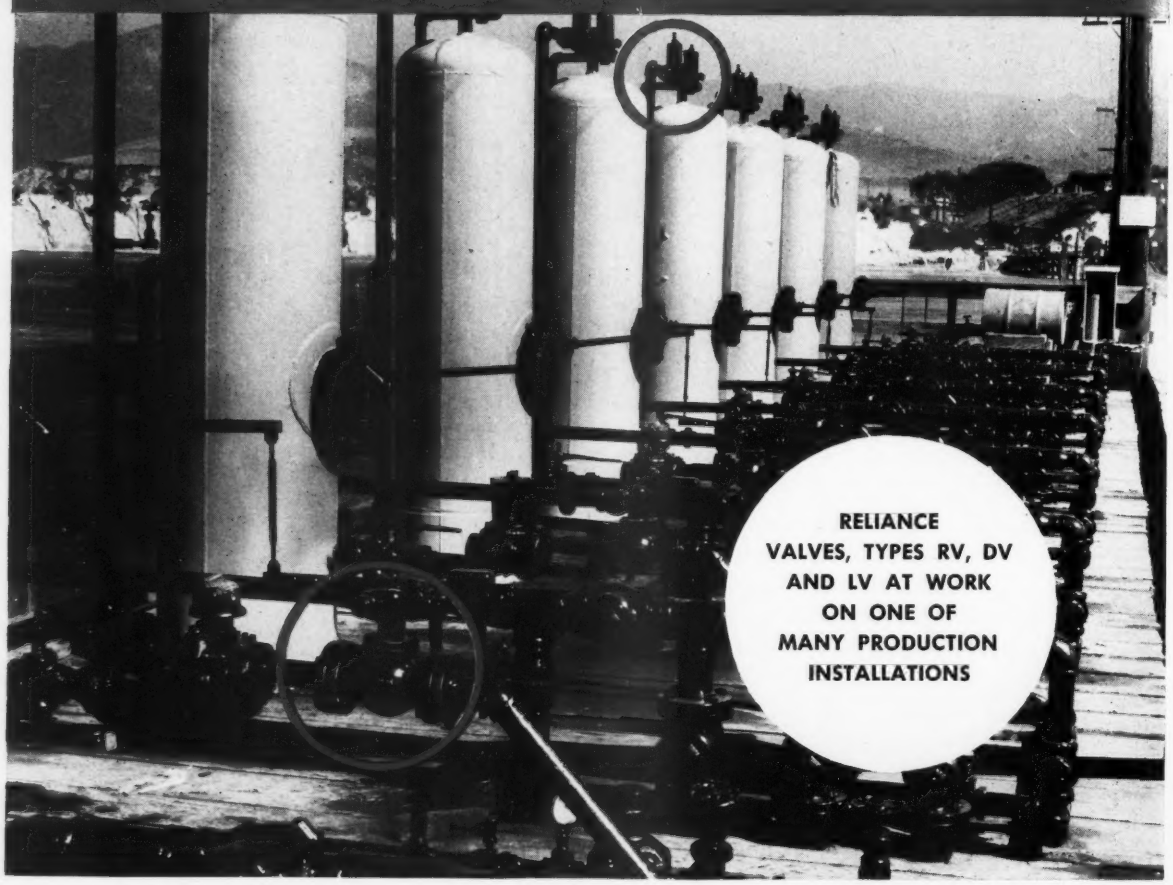
Robert V. New, who recently disposed of his interests in the Continental Companies is re-engaging in the oil business, under the name of Bob New Incorporated. Offices have been established at 1111 Bankers Bldg., 629 S. Hill St., Los Angeles, telephone VAndike 5571.

O. P. Branyon, buyer in General Petroleum's purchasing department at Verngil, Thomas Keller, price and distribution clerk at the company's offices at 9th and Hill streets in Los Angeles, and C. H. Maillard, gang foreman for the pipeline department, have just rounded out thirty years of service under the banner of the "Flying Horse."

Norton P. Bosemer has been placed in charge of the Los Angeles office of Tube Turns, Inc.

Mr. Bosemer joined the Tube Turns sales staff in April, 1937, and was assigned to the San Francisco office in May, 1944.

OIL PRODUCERS CHOOSE *RELIANCE* FOR DEPENDABLE SERVICE



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Bethlehem Announces Change of Field Store Organization

For the purpose of providing a better service to customers, Wendell M. Jones, Vice-President and General Manager of Bethlehem Supply Company of California, announces a change in field store organization under the general supervision of Glenn E. Pitts, Manager of Field Stores.

Heretofore, each of the ten units, namely, Long Beach, Wilmington, Santa Fe Springs, Castaic, Santa Maria, Bakersfield, Taft, Ventura, Avenal, and Rio Vista, has reported directly to Glenn E. Pitts. Under the new setup these stores will operate in three divisions—Los Angeles Basin, Coast and San Joaquin Valley.

In the Los Angeles Basin group will be the Long Beach, Wilmington and Santa Fe Springs stores, in the Coast Division the Ventura, Castaic and Santa Maria stores, and in the San Joaquin Valley Division the Bakersfield, Taft and Avenal stores. The Rio Vista store will function in close cooperation with the San Francisco operations.

Lynn Guttery | Dave Hardie | Roger Brown

Dave Hardie will manage the Los Angeles Basin Division, with headquarters at the Long Beach store. Hardie has just completed 18 years of service with the company at this location.

Lynn Guttery will be manager of the Coast Division, with headquarters at Ventura. He is in his 15th year of service with the company.

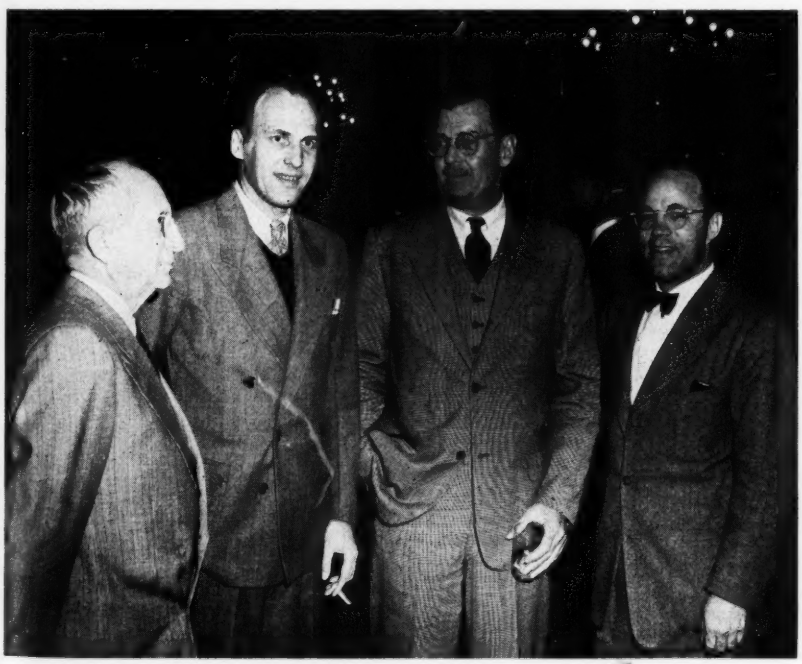
Roger Brown, who has 18½ years of service, will be manager of the San Joaquin Valley Division, with headquarters at Bakersfield.

By this close coordination of the activities of division stores, customers will be assured of receiving the full benefit of Bethlehem Supply's large inventories.

A.I.M.E. Petroleum Chapter Southern California Section

The Southern California section of the American Institute of Mining and Metallurgical Engineers held its first All Division Meeting at the University Club in Los Angeles. The meeting was held in honor of Dr. Clyde Williams, 1947 President of A.I.M.E. He is also Director of Battelle Memorial Institute.

Dr. Williams addressed the Engineers on the subject "Industrial Research". He pointed out the results of American research which are visible today in the utilization of mineral resources which, thirty years ago, were considered uneconomical because of low concentration or complex chemical structure. The present expenditure of $350,000,000 annually by American business firms demonstrates that American industry will keep its place as a leader in world production of raw materials and finished goods. He also pointed out the value of government research which spends almost twice as much as private industry.



Left to right: G. L. Roger, C. W. Dougan, Otis Booth and Larry Chasteen.

The meeting was presided over by Mr. Stuart Ingram, Chairman of the Southern California Section. He introduced the new officers and committee chairmen who will carry on the activities for the technical group for 1948.

Mtn. View Well Starts

Cleveland Oil Co. has staked location for Mid-State No. 1 in Sec. 29-30s-29e on the 20-acre Mid-State lease in the Mountain View field. Located on the south side of the Ten Eyck fault, the well will aim for the Transition zone at approximately 5400 ft. Bolsa Chica Oil Corp. is starting Di Giorgio No. 1 in Sec. 4-31s-29e

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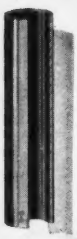

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Every production man will want to know about the new D+B stainless steel "Endurall" pumps. For here is a completely new line of deep well plunger pumps designed and proven to withstand the most severe pumping conditions. A special new stainless steel alloy makes these pumps unbelievably resistant to both corrosion and abrasion. Combine with this, the D+B advanced design, precision workmanship and rigid shop inspection, and you have the reasons why production men are acclaiming the new "Endurall" pumps as the finest obtainable at any price. Ask your D+B field representative for complete information. Complete pumps, or replacement parts for your pumps now in service are available for immediate delivery. Made to A.P.I. specifications. Investigate today to increase your pumping profits tomorrow!

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A.P.I. Committee Named

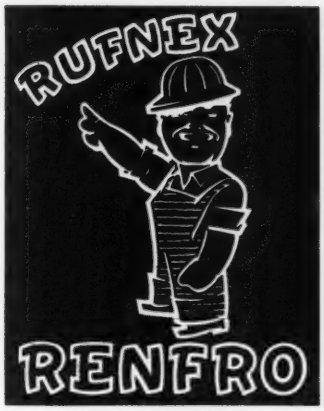
The Pacific Coast District of the American Petroleum Institute will hold its annual spring meeting next May 6th and May 7th at the Biltmore Hotel, Los Angeles, was announced by E. V. Watts, Chairman of API's Division of Production on the West Coast. In describing plans, Lot Bowen of Western Gulf, general chairman for the two-day affair, stated that, as in the past, morning and afternoon sessions will feature technical papers by industry engineers on oil well drilling and producing operations, as well as papers of general interest to the industry. Meetings will be open to all interested persons, there being no registration fee. A banquet on the evening of May 6th will feature as guest a prominent speaker whose name will be announced at an early date.

Those named by Bowen to handle all preparations for the meeting are as follows:

Production Session Program Committee: M. B. Standing, California Research Corp., Chairman; J. E. Sherborne, Union Oil Company of Calif., Vice-Chairman; R. H. Smith, Signal Oil & Gas Co.; Oran Graybeal, Barnsdall Oil Co.; C. R. Dodson, University of Southern California; George Laurent, Standard Oil Company of Calif.; C. F. Gates, General Petroleum Corp.; Dean Sheldon, Consultant; W. R. Wardner, Jr., Conservation Committee of California Oil Producers.

Drilling Session Program Committee: O. W. Chonette, The Texas Company, Chairman; J. N. Gregory, Shell Oil Co., Inc., Vice-Chairman; F. L. Wadsworth, General Petroleum Corp.; D. S. Johnston, Signal Oil & Gas Co.; R. W. Marshall, Drilling & Exploration Co.; R. J. Stephens, Kern Oil Co., Ltd.; J. S. Surfluh, Standard Oil Company of Calif.

Arrangement Committee: I. B. Doyle, Hydril Co., Chairman; W. C. Brooks, Byron-Jackson Co., finance; D. J. Hall, McCullough Tool Co., accommodations; J. A. Moore, Oil Base Inc., ticket sales; J. W. Davis, The Texas Co., publicity; and L. C. Thomson,, Western Gulf Oil Co., preprints.



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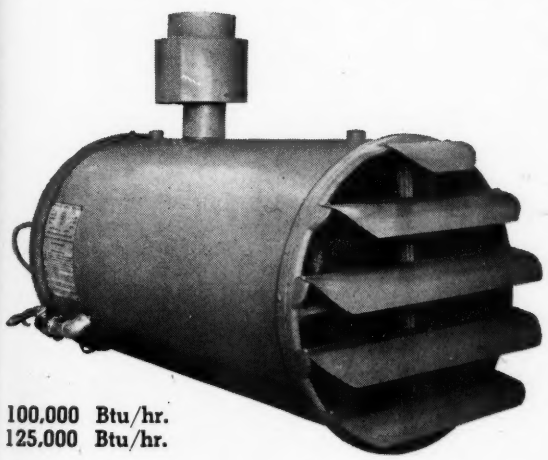
Dominguez Try Reams

Having successfully completed a fishing job, Morton and Sons is reaming to run liner in Dominguez Estate No. 1 in Sec. 3-4s-13w on the south flank of the Dominguez field. The hole is plugged back from 8144 to 8015 ft.

New John Zink UNIT HEATER



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Field Development

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Los Angeles Basin

Newhall Test Area

Mutual Development Corp.'s Larsalle No. 1 test well in Sec. 10-3n-16w, southeast of the Newhall-Potrero field, is down 7980 ft. and reaming. The company's Sanborn No. 1 in Sec. 6-3n-16w failed to recover fish and is standing suspended at 6415 ft. A new well may be drilled in the vicinity of the Sanborn venture. Bankline Oil's Newhall Corp. No. 1 in Sec. 31-4n-16w is drilling at 8267 ft.

Lawndale Field Adds Deep Zone

Seaboard Oil Co. has found a new deep zone in the old Lawndale field with its Pauley-Seaboard No. 81-20 in Sec. 20-3s-14w, which went to a total depth of 7996 ft. for a current yield of 238 barrels of 60.4 gravity oil through an 8/64-in. bean, along with 4,527,000 cubic ft. of gas daily. Tubing and casing pressures were reported as 2720 and 2580 pounds respectively.

The old Lawndale field once was an important center of production. At the present time, however, only a couple of the original 78 wells continue to pump.

Seal Beach Try Planned

Another well offshore Seal Beach is planned by Marine Exploration Co. in Sec. 11-5s-12w, Los Angeles County.

The new well is known as State No. 2 and is only 27 feet from the first well. It will bottom, however, some distance from the State No. I well.

State No. 2, like its predecessor, will be slant drilled at a high angle to sub-surface beds approximately one mile from shore. In the event of production success, the company probably will construct an island a mile off the beach city and use this as the surface site for additional operations.

Inglewood Well Flows

Basin Oil Co. has completed at 10,405 ft. its Inglewood Comm. No. 3-1 in Sec. 28-2s-14w at Inglewood in Los Angeles County. Present yield is 122 barrels of 37 gravity crude daily through a 12/64-in. bean, cutting 8 per cent. No. 5-1 and No. 7-1 in the section are drilling at 9428 ft. and 5816 ft., respectively.

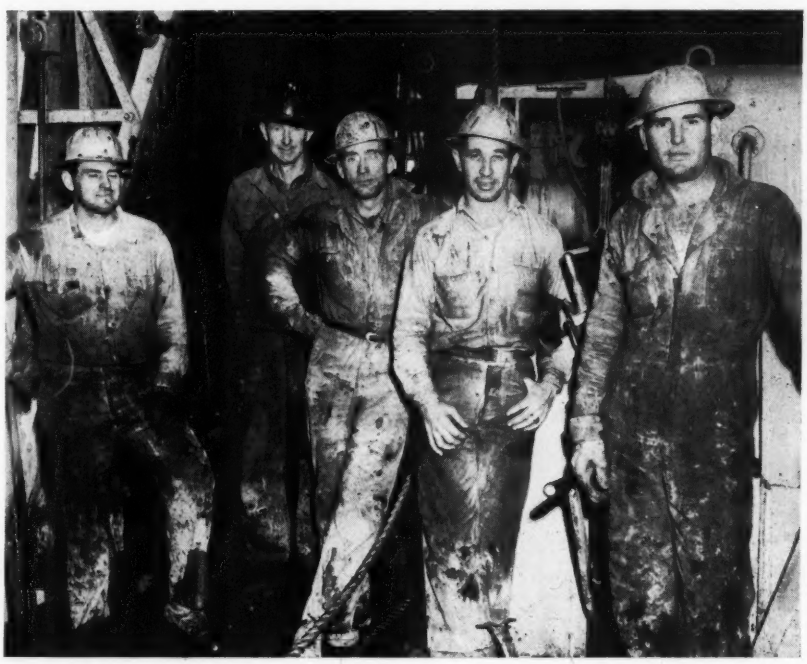
In the Richfield area of Orange County, Basin Oil is ready to pump its Collins-Wilson Comm. No. 1 in Sec. 33-3s-9w from a finishing depth of 4823 ft. The project sanded up when tested first on the pump.

Chino Hills Wildcat Digs

Chino Hills Oil Co.'s Chino Hills No. KB-4 in Sec. 33-2s-8w in the Chino area, San Bernardino County, is drilling steadily ahead at 960 ft.

Athens Area Adds Ground

Shell Oil Co. has extended the Athens area approximately one-half mile northeasterly by completion of



UNION PACIFIC WELL E-82 Long Beach, California. Tom Pike Drilling Co. Contractor. Left to Right: W. H. Moore, Rotary Helper; E. M. Parker, Cathead; J. F. Heard, Derrick Man; M. B. Balsiger, Driller; B. Williams, Rotary Helper.

its Moser Comm. No. 1 in Sec. 12-3s-14w. Total depth is 9013 ft., with casing set at 8010 ft. Output at last reports was 800 barrels of 34 gravity oil a day through a 16/64-in. bean, cutting 1.5 per cent. Gas figures are yet unavailable.

Previous test wells in the general area quit at relatively shallow depths. Between Shell's new field extender and the proved area, Sentinel Oil Co. drilled in 1925 to near 5200 ft. and stopped.

Orange County Scene of Tests

Orange County is the scene of a number of interesting test wells. Tide Water Associated Oil Co.'s Martin No. 1 in Sec. 21-5s-10w in the Santa Ana Gardens area is testing, after running electric log to bottom at 6554 ft. Shell Oil Co.'s Lamb Comm. No. 51-6 in Sec. 6-6s-10w in the Talbert area is spot coring at 6740 ft. Donnelly-McGee Oil Co. is drilling at 1363 ft. with Madeline No. 1 in Sec. 28-6s-10w at West Newport.

Canoga Park Venture Idle

Vincent F. Stabeck's Knapp No. 4 in Sec. 14-1n-17w near Canoga Park is idle at a plugged back depth of 510 ft. Original bottom is 790 ft.

North Del Valle Project Redrills

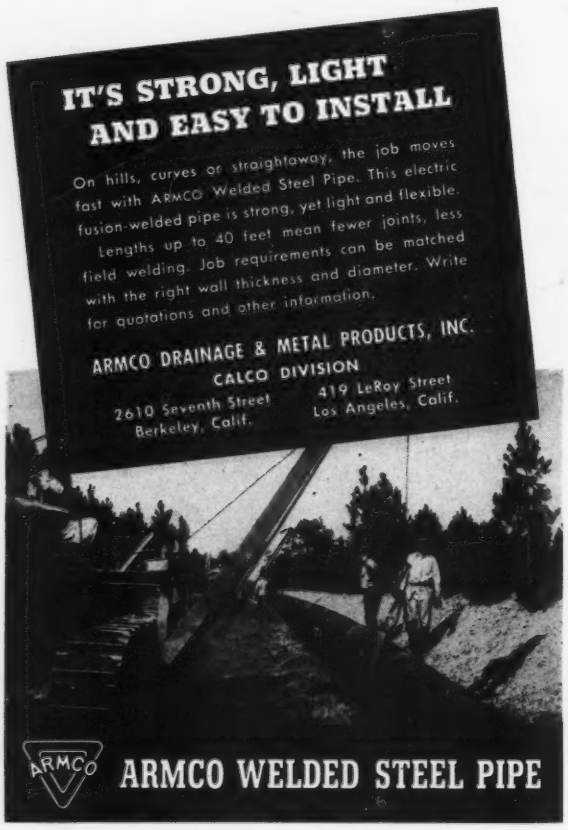
British-American Oil Prod. Co. is redrilling at 3848 ft. with Kinler-So. Cal. No. 1 in Sec. 16-4n-17w north of the Del Valle field. Original depth is 6857 ft. Side wall sampling was conducted between 4335-6150 ft. before the well was plugged back to 3628 ft. for a fresh start. The company's Park Bodger No. 1 in Sec. 22-3s-14w is redrilling at 9169 ft. Old bottom is 9408 ft.

Los Angeles Wells Drill

General Petroleum Corp. is drilling on down at 7561 ft. with Industrial No. 1 test well in Sec. 8-2s-12w at East Los Angeles. E. W. Pauley's Pacific Tube-Stewart No. 1 in Sec. 9-2s-12w is drilling at 7208 ft. Richfield Oil is pulling 7-in. casing to abandon its U. S. Rubber No. 1 in Sec. 16-2s-12w, which travelled to 8980 ft. in a vain quest for oil. The company's L. A. River Fee No. 1 in Sec. 34-1s-13w is making hole at 3040 ft. Vail No. 4 in Sec. 9-2s-12w is down 8198 ft. and is preparing to core. Boyle Comm. No. 17-1 in Sec. 35-1s-13w is a rig.

Aliso Canyon Test Spudded

Standard of California has spudded and is drilling ahead at 300 ft. with Del Aliso No. 2 in Sec. 29-3n-16w in the Aliso Canyon area. Standard's Houghton Comm. No. 1 in Sec. 36-2s-12w in the Santa Fe Springs area has reached a depth of 12,444 ft. and is conditioning mud. Six Companies No. 1 in Sec. 2-3s-15w was put on the pump at a redrilled depth of 6934 ft. for a yield of 13 barrels in 4 hours, cutting 52 per cent. Old depth is 7033 ft. No. 4 in the section is redrilling at 6409 ft., after going first to 6852 ft.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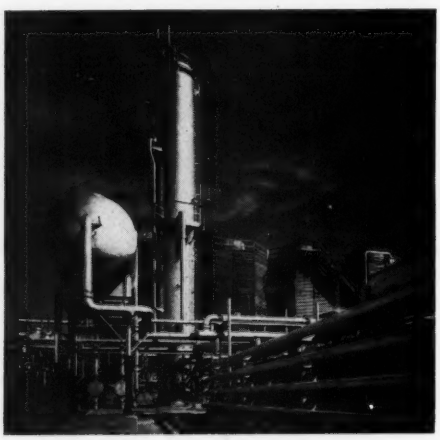

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San Joaquin Valley

San Emigdio Try Drilling

Continental Oil Co.'s K.C.L. No. L-2 in Sec. 8-11n-21w in the San Emigdio area is drilling hard shale at 12,522 ft. The well has casing set at 12,244 ft. Tests of a zone just below the casing shoe were not particularly encouraging due to evident tightness of the sand. Santiago No. 1 in the section is drilling at 8658 ft. The company is building rig for K.C.L. No. 0-1 in Sec. 9-31s-26e in the Buena Vista Hills area. In the Temblor area in San Luis Obispo County, Continental's British-American - Dodds - Thomas Unit No. 1 in Sec. 22-30s-20e is coring and drilling at 3228 ft.

Kern Bluff Adds Producer

Success attended Shell Oil Co.'s Wells-McGregor No. 1 in Sec. 7-29s-29e in the Kern Bluff area, which was completed at a plugged depth of 885 ft. for an output of 81 barrels of oil daily, cutting only 1 per cent. Total depth is 964 ft. No. 2 in the section is rigging to pump from 915 ft. No. 3 is a location. In the Globe Anticline area, Shell is drilling at 3471 ft. with Vedder-USL No. 1 in Sec. 9-31s-22e.

Sharktooth Try Rigs Pump

Barnsdall Oil Co. is rigging to pump from 2768 feet its Alma No. 5 in Sec. 15-28s-28e in the extension of the Sharktooth field. The Vedder was topped at 2768 ft. Alma No. 4 in the section currently yields 100 barrels of 13 gravity oil daily from 2783 ft. The company's El Portal Mining Co. No. 1 is a location in the section. Leutholtz No. 1 in Sec. 22-30s-22e near McKittrick is idle at 6543 ft.

Buena Vista Test Spudded

Western Gulf Oil Co. has started the drill in B.V.A. No. 18-3 in Sec. 3-32s-25e in the Buena Vista area and at last reports was down 1670 ft. U.S.-Case Comm. No. 1 in Sec. 23-11n-23w in the Santiago area has been redrilled to 3048 ft., after going first to 3483 ft. The company is now moving to locate water and plug with plastic.

Antelope Test Drills

Texas Co.'s Voight Two No. 1 in Sec. 32-27s-20e in the Antelope area is drilling ahead at 2273 ft. Tulare NCT One No. 16-28 in Sec. 28 and Westpet NCT One No. 87-29 in Sec. 29-30s-22e are drilling ahead at respective depths of 7176 and 2273 ft.

North Coalinga Wildcat Deeper

Sharples Oil Corp. is making steady progress with the drill at 6652 ft. in Hyde No. 3 test in Sec. 6-19s-16e in the North Coalinga area, Fresno County.

Kettleman Hills Explorer Drills

Standard of California continues to prospect at 10,167 ft. with S.F. & F.L. No. 4-2 wildcat in Sec. 12-25s-19e in the South Dome area of Kettleman Hills, Kern County. The

Shell Oil Co., Moser Comm. No. 1, located at Western and 120th St., Los Angeles, Rocky Mountain Drilling Co., contractors, front row left to right: O. P. Lindelof, derrickman; E. B. Johnstone, floorman; Rear row, left to right: R. A. Blackwood, cat head; Geo. W. Forrester, driller; L. J. Lotspeich, floor man.

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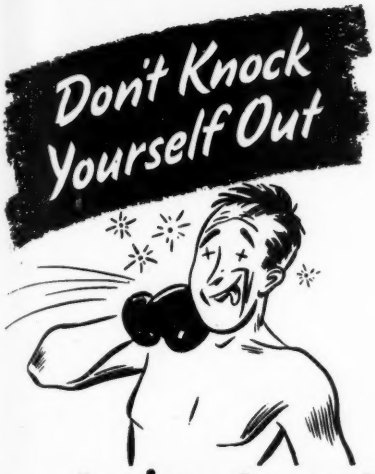
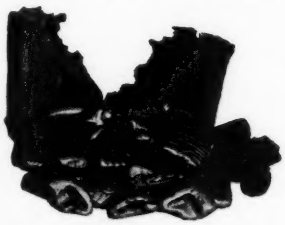
LUcas 0281	Higate 4-2030	Enterprise 10942	Charter 4-1761



. . . trying to get this sort of junk out of your well!



(Below) An assortment of Metal Junk

(Above) Rubber Sleeve, Slips, and Pieces of Body of Bridging Plug

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yield from the company's No. 73-30V in Sec. 30-23s-19e in the Middle Dome area is 190 barrels of 49 gravity oil daily through a 11/64-in. bean, cutting 12 per cent. Gas output is 1,640,000 cubic ft. a day. Water shut off at 7421 ft. is being tested in the company's Tupman No. 2 in Sec. 22-31s-29e in the Arvin area. Van Sicklin No. 45 in Sec. 36-27s-21e near Lost Hills is drilling at 697 ft.

Jasmine Try Starts

Quinn Ranch Oil Co. has made location for No. 1 well in Sec. 15-25s-27e in the Jasmine area, Kern County. Location is in the general area of wells owned by Pacific Oil & Gas Dev. Corp.

Bacon Hills Test Active

Seaboard Oil Co.'s No. 58-21 in Sec. 21-28s-20e in the Bacon Hills area has reached 595 ft. and is testing shut off on 4 holes at 425 ft. Brown shale was topped at 530 ft. Casing is set at 593 ft .

Grapevine Try Rigging Pump

Pump is being rigged to Drilling & Production Co.'s J. V. No. 78-32 in Sec. 32-11n-19w in the Grapevine-Tejon area. J. V. No. 77-32 in the section is a location. Richfield Oil Corp. has abandoned its No. 557-35 in Sec. 35-11n-19w at 4119 ft.

Cuyama Valley Wildcat Coring

F. R. Anderson & Associates is coring in oil sand at 1760 ft. with Hadley No. 1 in Sec. 25-11n-28w in the Cuyama Valley area of San Luis Obispo County. Norris Oil Co.'s Cuyama No. 2 in the section has been completed at 1918 ft. for an output of 90 barrels of 21 gravity oil daily, cutting 15 per cent. Yield is restricted by a 7/76-in. bean. The hole was carried to 1990 ft. and plugged back to 1918 ft. for the final touches. Pacific Continental Oil Co.'s Patricia No. 1 in Sec. 26-11n-28w is idle.

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GIVES ONE HOUR'S PROTECTION IN UNBREATHABLE AIR

Generates its own oxygen, without cylinders, high-pressure valves or fittings.

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Salt Creek Test Drills

Richfield Oil Corp.'s Richardson No. 1 in Sec. 18-29s-21e in the Salt Creek area, which topped Media shale at 3310 ft., has progressed to a point near 4875 ft. and is drilling ahead. M. & L. No. 78-24 in Sec. 24-31s-25e in the Paloma area is drilling at 7625 ft.

Edison Test Drills Ahead

First National Finance Corp. is digging below 2700 ft. with De Mille-First National-Jeppi No. 1 test well in Sec. 17-30s-29e in the Edison area. General Petroleum's Cottonwood-So. Cal. No. 22-30 wildcat in Sec. 30-29s-30e is making hole at 1207 ft.

Arvin Try Developing

Drilling is continuing below 8300 ft. in British-American Oil Prod. Co. and Capital Co.'s Arvin Comm. No. A-47 in Sec. 26-31s-29e in the Arvin area. Core at 8106-8129 ft. recovered 10 ft. of Koalinitic sand. A core at 8218-8248 ft. recovered gray sand.

Carneros Creek Wildcat Drills

Near Carneros Creek in Kern County, Independent Exploration Co. is drilling shale at 2980 ft. with Anderson No. 2-29 in Sec. 29-28s-20e. The Phacoides was topped 2782 ft. The company has made location for Swab No. 2 in Sec. 15-28s-28e in the Sharktooth area.

Shale Hills Test Deeper

Berry No. 1 exploratory hole, sponsored by General Petroleum in Sec. 15-28s-20e at Shale Hills, is drilling on down at 7107 ft. The company's Ninkovich No. 62-9 in Sec. 9-30s-21e in the McKittrick area is prospecting at 8225 ft.

ACREAGE

6000 acres, a large portion of which is located on a major, untested anticline in So. Calif. is available to interested principals adequately financed to start immediate drlg. operations. Louis E .Mahoney, M.D., 710 Wilshire Blvd., Santa Monica, Calif. 2/20b

Coastal and Northern District

Purisima Hills Wildcat Starts

Wildcat ground four miles east of the Lompoc field in the Purisima Hills area of Santa Barbara County has been chosen for a new and interesting exploratory campaign.

The play involves more than 1500 acres. Sponsors are Union, Fullerton, Pacific Western and Richard R. Crandall, geologist.

Union will drill the first well on Government land held by Pacific Western and Crandall in Sec. 12-7n-33w. It will prospect all the way to basement.

Union owns in fee several hundred acres in the area and is the holder of substantial production in the Lompoc field proper. The explorer has been called Santa Rita No. 1.

Kirby Hills Well Testing

Shell Oil Co. is perforating and testing with Lambie No. 5 gas test in Sec. 25-4n-1w in the Kirby Hills area. Total depth is 6802 ft., with plug at 5645 ft.

Rio Vista Test Digs

In the Rio Vista gas area, Amerada Petroleum Corp. is drilling at 1882 ft. with Emigh No. 8 in Sec. 35-4n-2e. Surface pipe was set at 614 ft.

Guadalupe Test Quits

Continental Oil Co. has abandoned LeRoy No. 1 test in Sec. 3-10n-36w in the Guadalupe area in San Luis Obispo County. The well, located northwest of Santa Maria, was taken over by Continental from Sand Dune Oil Co. Total depth is 3503 ft.

Montalvo Test Rigs

Standard of California has rig up for Eastwood No. 1 test in Sec. 33-2n-22w in the Montalvo area. Drill site is southeast of an early exploratory hole drilled by Shell Oil Co. on the Leonard Ranch. The company has abandoned Maxwell No. 1 in Sec. 23-2n-23w, after recovering stuck drill pipe to 12,972 ft. Total depth is 17,696 ft., the deepest hole ever drilled in California. The company has location staked for McGrath No. 62 in Sec. 25-2n-23w.

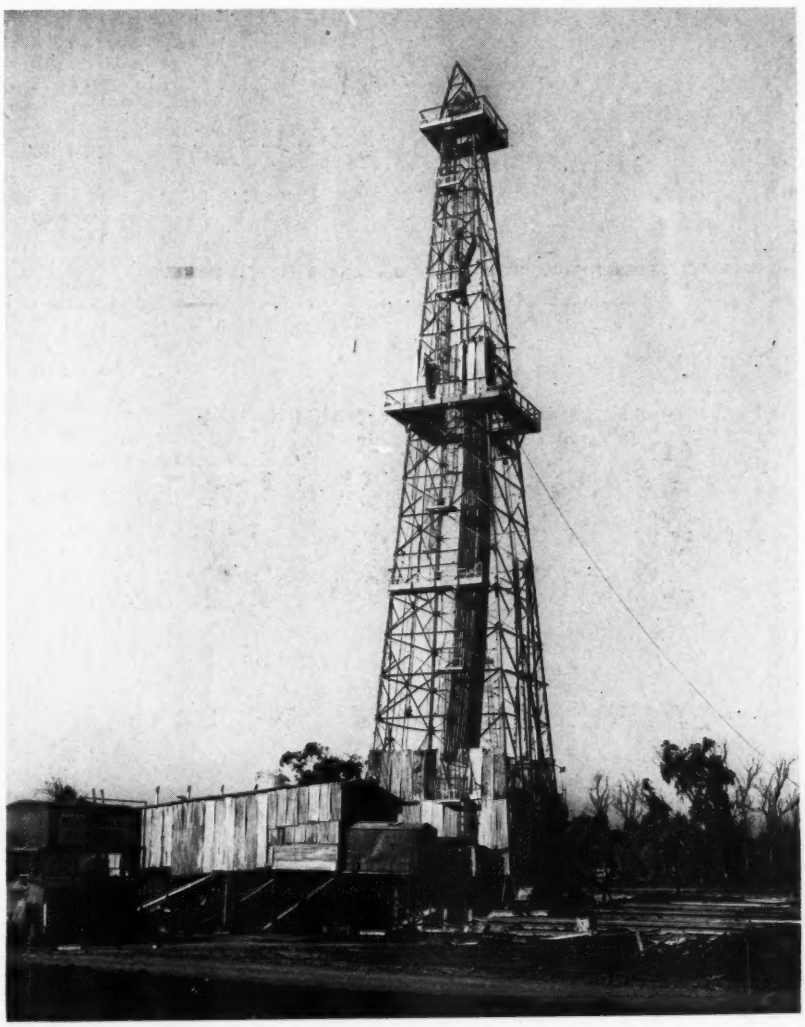
Richfield Oil Corp., meanwhile, is grading ground for Bailard Mee No. 1 in Sec. 20-2n-22w. Del Cielo No. 1 in Sec. 30-2n-22w has been completed at 10,400 feet. Initial output was 15 barrels in 8½ hours, cutting 60 per cent.

San Ardo Try Cores

Jergins Oil Co. and North American Cons. Oil Co. are coring at 2065 ft. with McCool No. 1 in Sec. 27-22s-10e in the San Ardo area, Monterey County. Oil sand was topped at 1940 ft. or more than 150 ft. higher than in The Texas Co.'s discovery well. McCool No. 3-1 in Sec. 15-22s-10e is a location.

Huasna Wildcat Planning Tests

Danciger Oil & Refining Co. is running electric log in Twitchell No. 1 in Sec. 35-32s-15e in the Huasna area, preparatory to plugging and testing. Hole is bottomed at 5043



Abandonment of the deepest well ever drilled for oil in California. Maxwell No. 1 located near Ventura was announced by Standard of California. The hole was down to 17,696 feet when the drill pipe stuck and repeated efforts failed to loosen entire string. No oil was found.

Previous deepest well in California was 16,668 feet in San Joaquin County.

10 GOOD REASONS WHY OPERATORS PREFER

McCullough
GUN PERFORATOR SERVICE

1. **MEETS EVERY CONDITION.** Guns fired either electrically or mechanically: guns run on cable, sand line, drill pipe, tubing, or on piano-wire measuring line in extremely high-pressure wells.
2. **SIMULTANEOUS FIRING** under all conditions gives exact spacing of shots, perfect perforation pattern, and saves down-the-hole time.
3. **ACCURATE DEPTH MEASUREMENTS** put the shots right where you order them.
4. **MAXIMUM PENETRATION** of bullets into the formation, as proved repeatedly in competitive field tests.
5. **GUNS TO FIT EVERY CONDITION.** McCullough employs more than 30 different types and sizes of guns.
6. **ALL SIZES OF BULLETS** from ½" dia. up to ¾" dia., to fit every possible need.
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8. **NO LOST TIME.** McCullough's simpler, lighter equipment cuts setting-up and moving-out time, speeds up every job.
9. **EXPERIENCED MEN.** With years of experience behind them, thoroughly-trained McCullough gun-perforating crews do their jobs quickly, efficiently, safely.

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LOUISIANA: Houma, Lake Charles, New Iberia, Shreveport
WYOMING: Casper

EXPORT OFFICE: 30 Rockefeller Plaza, New York 20, N. Y.

ft., with top Miocene sandstone at 4810 ft.

Simi Well Comes In

Union Oil Co.'s new well in the Simi area, Canada de la Brea No. 11 in Sec. 32-3n-18w, is yielding from 1980 ft. 65 barrels of 16.6 gravity crude daily. Union's Wickenden No. 1-28 wildcat in Sec. 28-9n-32w is bottomed at 6508 ft. and testing.

Zaca Wells Ready To Pump

Tide Water Associated Oil Co.'s Chamberlin No. 51 in Sec. 32-8n-31w and Luton No. 135 in Sec. 29-8n-31w in the Zaca area are ready to pump from finishing depths of 6125 and 5301 ft., respectively. Davis No. 35 in Sec. 33-8n-31w is rigging up.

Conejo Venture Repairs Equipment

Ti-Bell Drilling and Roy, Inc., is repairing equipment on Janss No. 1 exploratory venture in Sec. 33-2n-19w in the Conejo area, Ventura County. Present depth is 6500 ft.

Saticoy Test Cleaning Out

Superior Oil Co. is engaged in clean-out operations with Saticoy No. 1 test in Sec. 10-2n-22w near Saticoy, after recovering fish to 11,809 ft. The base of the fish is placed at 12,951 ft., with present depth of the hole at 13,581 ft.

Salinas Try Drills Ahead

Near Salinas in Monterey County, Sand Bowl Group was last reported prospecting ahead at 740 ft., with Metz No. 1 wildcat test in Sec. 1-15s-1e.

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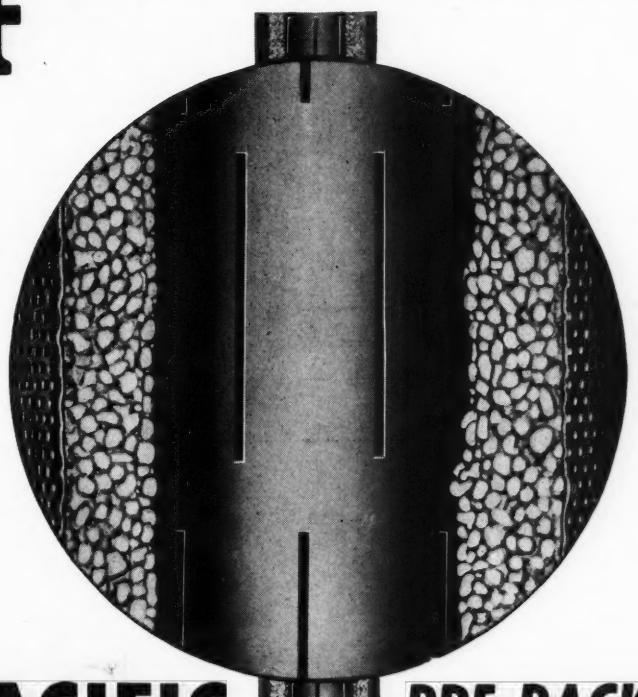
Ojai Venture Spot Coring

Spot coring at 3419 ft. constitutes the current stage of operations in Richfield Oil Corp.'s Ojai No. 52 test in Sec. 13-4n-22w in the Ojai area, Ventura County. Cellar has been excavated for No. 53 in the section.

Sespe Test Drilling On

Republic Operators, Inc., is drilling at 5407 ft. with Arundell No. 6-1 in Sec. 6-4n-19w in the Sespe area. Eagle Rock Pet. Co. is repairing roads for Eagle Rock No. 1 in Sec. 36-5n-20w. The well is presently bottomed at 1110 ft.

4 OUTSTANDING ADVANTAGES OF



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Wherever sand is encountered, Pacific equipped wells are producing with maximum efficiency year after year—without sanding up the pumps or prematurely damaging other expensive equipment.

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California Oil World's Monthly Summary

DEVELOPMENT—PRODUCTION
PACIFIC COAST TERRITORY
CALIFORNIA DEVELOPMENT—PRODUCTION

	DECEMBER, 1947 DEVELOPMENT				PRODUCTION	
	Active Drilling Wells	Oil Wells Completed	Initial Production B/D	Oil Wells Completed FIRST 12 Months	Daily Average December 1947	Daily Average December 1946
SAN JOAQUIN VALLEY REGION						
Ant Hill				1	1,230	1,546
Antelope Hills					1,305	1,482
Bellevue					359	300
Belridge—North					3,582	5,041
Belridge—South	5	6	188	46	5,499	10,217
Blackwell's Corner	1				130	223
Buena Vista Hills				8	46,166	46,240
Canal					2,066	1,973
Coalinga Group						
Eastside	3	1	5	10	18,307	14,462
Oil City					87	97
Coalinga—Nose					52,688	50,064
Coalinga—Northeast	1	1	34	8	8,469	7,757
Pleasant Valley				1	3,883	3,517
Jacalitos	1	1	25	15	4,907	4,065
Westside	1			7	6,464	6,472
Coles Levee—North	2	1	441	9	17,223	16,155
Coles Levee—South	2			5	3,255	2,267
Edison	2			9	9,841	14,720
Elk Hills	4			16	6,905	6,956
Fruitvale		1	42	1	6,317	7,148
Greeley					14,030	10,592
Helm	1			3	4,143	4,304
Kern Front	4	5	155	42	8,631	8,696
Kern River	18	20	789	108	11,080	9,449
Kettleman North Dome	4			16	36,727	38,116
Lanare				2	1,417	2,425
Lost Hills	10	2	51	99	6,181	3,855
McKittrick Group						
Belgian Anticline	1	2	421	6	973	
Cymric	4	5	199	35	16,264	11,933
McKittrick				2	2,878	2,960
McKittrick Front	2			9	1,333	1,713
Phacoides						
Salt Creek	1			46	6,442	2,752
Sheep Springs				7	1,445	313
Temblor Ranch				1	104	144
Midway-Sunset	8	9	462	62	41,230	43,089
Mt. Poso Group	3			9	13,168	15,243
Mountain View	2	2	188	14	4,314	4,725
Paloma	7	3	1,438	37	10,626	7,327
Poso Creek Group	2	1	17	14	3,534	3,394
Pyramid Hills					255	279
Race Track Hill	1	2	224	12	1,839	1,926
Raisin City		1	132	3	2,609	2,814
Rio Bravo					12,524	13,186
Riverdale				3	3,849	4,168
Rosedale Ranch					75	123
Round Mountain Group	3	1	84	8	7,834	8,927
Strand					813	1,495
Strand—East					563	503
Tejon Ranch				23	3,444	2,285
Ten Section	1			1	7,462	8,125
Union Avenue					315	378
Wasco					147	490
Wheeler Ridge					216	228
Williams						
Other Fields	5	1	241	20	1,771	225
TOTAL—San Joaquin Valley Region	99	65	5,136	718	426,325	418,884
COASTAL REGION						
Santa Maria District						
Casmalia	1	2	271	4	786	437
Cat Canyon—East					381	127
Cat Canyon—West	3	3	645	37	13,641	8,487
Four Deer	1	1	148	4	336	
Gato Ridge					3,827	3,780

	DECEMBER, 1947 DEVELOPMENT				PRODUCTION	
	Active Drilling Wells	Oil Wells Completed	Initial Production B/D	Oil Wells Completed FIRST 12 Months	Daily Average December 1947	Daily Average December 1946
COASTAL REGION—Continued						
Lompoc	2	1	135	37	5,315	2,407
Olivera Canyon	.....	.....	.....	1	285	.....
Orcutt	2	1	93	27	4,867	3,836
Santa Maria Valley	1	3	466	32	22,431	30,099
Tinaquaic	.....	.....	.....	1	.....	.....
Zaca Creek	.....	.....	.....	1	783	439
Santa Barbara District						
Capitan	.....	.....	.....	.....	3,050	3,311
Elwood	1	1	285	1	6,796	6,886
Santa Barbara	.....	.....	.....	.....	49	68
Summerland	.....	.....	.....	.....	.....	2
Ventura District						
Montalvo West	1	.....	.....	2	177	.....
Padre Canyon	1	2	1,312	10	4,040	2,475
Rincon	.....	.....	.....	.....	3,415	4,175
San Miguelito	.....	.....	.....	11	5,076	5,354
Ventura Avenue	6	4	2,810	44	52,369	46,303
North Santa Clara District						
Del Valle	4	1	25	24	9,112	7,255
Hopper Canyon	.....	.....	.....	1	240	197
Oak Canyon	.....	.....	.....	2	1,872	1,528
Sespe Canyon Group	1	.....	.....	1	171	259
Temescal	.....	.....	.....	.....	558	599
Others	1	1	167	3	535	244
South Santa Clara Valley District						
Aliso Canyon	2	.....	.....	5	3,459	3,117
Bardsdale	1	2	208	5	403	429
Newhall-Potrero	3	.....	.....	8	6,796	6,027
Oxnard	.....	.....	.....	2	1,516	760
Shiells Canyon	.....	.....	.....	3	955	1,126
South Mountain	2	1	752	15	5,401	3,925
Others	2	.....	.....	25	1,784	533
San Luis Obispo, Santa Barbara, Santa Clara and Monterey Counties	.....	3	81	13	339	31
TOTAL—Coastal Region	36	26	7,398	328	160,761	144,216
LOS ANGELES REGION						
Brea-Olinda	3	2	774	25	13,410	11,280
Coyote—East	.....	.....	.....	11	4,694	4,675
Coyote—West	2	2	191	22	15,232	15,047
Dominguez	1	4	1,209	15	14,436	14,925
East Los Angeles	2	.....	.....	4	1,171	640
El Segundo	.....	.....	.....	.....	394	566
Huntington Beach	19	18	2,222	117	53,018	47,217
Inglewood	2	1	281	5	11,443	12,141
Long Beach	7	.....	.....	8	23,008	23,970
Montebello	.....	.....	.....	1	6,971	7,897
Newport	2	2	313	51	6,605	7,091
Playa Del Rey	.....	.....	.....	.....	1,924	2,150
Potrero	2	.....	.....	2	1,024	694
Richfield	1	.....	.....	6	6,482	6,688
Rosecrans-Athens Group	3	1	60	3	4,616	4,840
Santa Fe Springs	1	1	51	2	15,751	16,539
Seal Beach	2	1	59	15	11,151	10,632
Torrance	1	1	44	3	7,728	8,349
Whittier	.....	.....	.....	1	924	1,011
Wilmington	23	33	11,469	258	138,168	117,959
Yorba Linda	.....	.....	.....	.....	206	186
Other Fields	4	1	254	4	1,755	1,437
TOTAL—Los Angeles Region	75	67	16,927	553	340,111	315,934
EXPLORATORY						
Outpost Wells	44	.....	.....	.....	.....	.....
Wildcats	14	.....	.....	.....	.....	.....
Gas Wells	5	2	Gas	47	.....	.....
TOTAL CALIFORNIA	273	160	29,461	2,103*	927,197	879,034

*Includes gas wells completed and 457 drilling wells abandoned.

With Drilling Contractors

Drilling and Exploration Co., Inc., is drilling on contract the second information well for Union Oil Co. in the Chaco area in Paraguay. Incidentally, these two holes are the first petroleum seekers ever drilled in Paraguay.

Dick Reniers, who recently returned to United States from Paraguay operations, has been replaced by Jim Hoagland. Another new addition to activities at Chaco is Stan Martin, Union Oil Co. engineer at the rig site.

Drilexco during 1947, among other contract jobs in the Paloma field, drilled seven wells for Western Gulf Oil Co. They averaged 11,500 feet in depth. The last two wells were cored from the bottom of the 7-in. casing through the entire column of oil sand with a diamond core head.

W. F. (Frank) Jones, who has been a member of the oil fraternity since 1919, was elected secretary of the California chapter of the American Association of Oilwell Drilling Contractors at the recent meeting of the state body. He succeeded Ed Simonis of Santa Maria Drilling Co.

The meeting of the California chapter was featured by an address by E. C. (Ned) Brown of Brown Drilling Co. at Long Beach, national president of the association.

Brown stated that the association's list of members continues to grow and that the 1948 program is being actively conducted in producing areas throughout the country. The A.A.O.D.C. president, recently completed a tour of oil centers in Mid-Continent states.

Thomas P. Pike Drilling Co. has moved a portable drilling outfit to the San Ardo area in Monterey County to drill the first of two wells for the joint account of Jergins Oil and North American Oil Consolidated. The first job will be McCool No. 1 in Sec. 27-22s-10e. The second will be McCool Three No. 1 in Sec. 15-22s-10e. McCool No. 1 is about 4000 ft. northeast of Texas Co.'s Lombardi No. 1 discovery.

Contract has been assigned to Santa Fe Drilling Co. to drill Huntington No. H-34 for Standard of California at Huntington Beach. The contractor has spudded-in Seaboard Oil's No. 58-21 at Bacon Hills, after finishing successfully No. 26-21.

Crestmont Oil Co. has let contract to George Terry Drilling Co. for 10 wells on the May lease in Sec. 8-29s-28e in the Kern River field. Terry is about to spud Crestmont's Ramona No. 1 in Sec. 13-4n-18w in the Ramona field.

The Nomad's Los Angeles chapter recently elected as an honorary member E. C. (Ned) Brown, Brown Drilling Co., Long Beach.

Union Oil Co. has contracted with Bell & Burden, Inc., to drill Hellman No. 61 in the Dominguez field.

California Commercial Drilling Co. has started drilling Star No. 101 for Whittier Co., Ltd., in Sec. 24-26s-20e in the Lost Hills field.

K. L. Kellogg & Sons has been assigned contract to drill Stearns No. 104 for Union Oil Co. at Brea-Olinda.

Sponsored by the American Association of Oilwell Drilling Contractors, Long Beach City College will offer a special course in oil well drilling fluid.

Designed to aid toolpushers, derrickmen, drillers, roughnecks and others who require a working knowledge of drilling fluids, the course will run two weeks.

The association pointed out that these classes are not only open to members of the association but to all who are interested in drilling fluids.

Among the subjects to be covered are all the standard mud tests, use of chemicals in drilling fluids, control of viscosity, mud weight, water loss and starch and oil base muds.

The first class will meet March 8 at 7:30 p.m. at the John Dewey Vocational School at American avenue and Eighth street in Long Beach.

Neal Thompson, Baroid Sales Division, will conduct the course with the assistance of Dr. C. D. Barnes, Long Beach City College.

The A.A.O.D.C. educational program is under the direction of D. H. Graham, vice president of the association for California, and K. L. Kellogg, vice chairman of the research and educational committee. Other contract drillers on the committee are O. D. Gaiser, A. S. Hayes, Gene Reid and George H. McCarthy.

A small registration fee will cover cost of handbooks, supplies and equipment. Certificates of completion will be awarded to those who finish the course satisfactorily.

The association plans to sponsor additional classes in San Joaquin Valley for the benefit of persons there. Full information on the training course may be obtained by addressing Mud Class, 1456 East Hill street, Long Beach 6.

Progress is the American Way of life. The petroleum industry IS progressive.

LAUGH THIS OFF!!

Radio star: "Well, son, were you promoted?"

Seven-year-old: "Better than that, pop. I was held over for another twenty-six weeks."

Office Manager: You were twenty minutes late again. Don't you know what time we start work in this office?"

"No, sir, they're always working when I get here."

A well developed young lady had a slight cold. As a precaution, upon going to a dinner party, she took along two hankerchiefs, placing the extra one on the bosom of her dress. As dinner progressed she found she needed her spare handkerchief, but feeling about her dress bosom she couldn't find it. She then began to search intently, from left to right, until suddenly she realized every eye at the table was on her. Reddening, she smiled and murmured, " I know I had two when I left home."

Lady: "Well, doctor, was my operation a success?"

Man: "I'm not your doctor, I'm St. Peter."

A tough employer noted for his energy saw a boy leaning idly against a packing case whistling.

"How much are you getting a week?" he demanded.

"Twelve dollars,"

"Here's a week's pay. Now clear out. You're through."

As the boy pocketed the money, shrugged and strolled away, the busy man turned to the stockroom clerk. "How long has that kid been with us?"

"Him?" said the clerk, "Oh, he just brought over a package of bolts and nuts."

"How was it in the old days, Wise Eagle? Did you have to feed them forever after you licked the enemy?"

A lady was very much pleased because her husband had called her an angel. She was not accustomed to compliments from him and asked him why he had called her an angel.

"Because," he replied, "you are always up in the air, you are continually harping on something, and you never have a damn thing to wear."

Bill: Have you seen one of those new instruments that can tell when a man is lying?

Will: Seen one? I married one!

"Does that scarecrow really do any good?"

"Does it! Why it scared the crows so bad they brought back all the corn they stole last year."

JENSENS are different in a lasting way . . .

Pumping units all look pretty much alike—but for a Jensen, the similarity ends with looks.

Behind each Jensen is 28 years experience in design and manufacture. With this experience, and by using only the best in materials and workmanship, Jensen pumping units are built to give more dependable, economical performance that pays off year after year.

Get specific information on production economy by contacting your Jensen dealer or write Coffeyville.

Stocked by
THE OIL TOOL CORPORATION
3075 Cherry Ave., Long Beach, Calif.
Phone 481-81

JENSEN
BROTHERS MFG. CO.
COFFEYVILLE, KANSAS, U.S.A.
EXPORT OFFICE, 50 Church St.
New York City

the Corporation President

WHO ALMOST SLEPT TOO LONG

T. M. Stanton* was having a nightmare. For months he'd been preoccupied with the production problems of Empire Gadgets, Inc. So preoccupied, he'd even half-admitted to himself that he was devoting far less thought to national problems than a leading citizen should. But the urgency of his immediate interests kept shoving these concerns into his subconscious mind. Now they were torturing his sleep.

"T. M., old boy," one spectre was saying, "how would you like a nice black depression to come along and swallow up your whole company?" And a green-eyed ogre leered, "While you're neglecting your free-enterprise system, we're moving in with *another* system!"

Stanton's body lurched. "No!" he thundered. Awakened, he scratched his head, murmuring, "Gad, what a dream! H-m-m—wonder what sort of contribution I ought to be making . . ."

Here's Something, Mr. President, You Ought to Do Right Away!

Check up on the status of the Payroll Savings Plan in your company. By making U. S. Savings Bonds easily available to your employees "on the installment plan," it benefits not only the employees but your business and the nation as well! Here's how:

(1) The Payroll Savings Plan builds financial security for each participant. The Bonds pay $4 at maturity for every $3 invested.

(2) The experience of 19,000 companies operating the Payroll Savings Plan shows that it makes employees more contented in their jobs—cuts down absenteeism—even reduces accidents!

(3) The Plan helps to spread the national debt and thus helps secure your business future. How this works is clearly and briefly described in the free brochure shown below.

Why Executive Backing Is Vital

Employees still want the benefits of the Payroll Savings Plan. In fact, they *need* the P. S. P., because banks don't sell Bonds on a partial-payment plan—which is the way most workers prefer to buy them. But war-time emotional appeals are gone. Human nature being what it is, the success of the Plan in your company is liable to dwindle unless a responsible executive *keeps promoting it.*

So—today—*check up* on the status of the Payroll Savings Plan in your company. *Act* on your responsibility to see that it is vigorously maintained.

The State Director will gladly help.

Be sure to read this! *"The National Debt and You," a 12-page brochure, brings you the views of W. Randolph Burgess, Vice Chairman of the Board of The National City Bank of New York —and of Clarence Francis, Chairman of the Board, General Foods Corporation. Request your copy from the Treasury Department's State Director, Savings Bonds Division.*

**This one is fictitious—but it might be any corporation president.*

The Treasury Department acknowledges with appreciation the publication of this message by

CALIFORNIA OIL WORLD

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

Crescent Tool Introduces New Hydraulic "A" Frame

It is unusual for one type of equipment to be so universal in its application as the Crescent Tool Company's Hydraulic "A" Frame. This newly patented Hydraulic unit operates a full 180 degree arc and eliminates a separate truck to carry an "A" Frame and at least one truck driver. It permits full use of truck bed space on the same truck that carries the hydraulic "A" frame.

In addition to its many uses in the oil fields, pipe yards and refineries, it is now in use by electrical contractors and lends an easy hand to loading bailed cotton, heavy farm equipment, gas engines, pumps, compressors and other similar equipment.

This Hydraulic "A" Frame is operated by a single lever; raises or lowers to whatever position desired quickly. Its finger tip control permits the operator to stop and hold his load at any angle and when the Hydraulic system is not in use; and should the control lever be struck accidentally, you do not lose control of your load; this is an important safety feature. A load may be picked up with the winch line to bed level, at which point by pressing the lever the hydraulic system causes the boom to move back over the bed of the truck and to spot a load on the truck bed wherever desired. Unloading is accomplished the same way; by moving the boom back and picking up the load with the winch line, and then putting the hydraulic pressure to work . . . moving the load free of the truck bed, and placing it where desired.

Easily operated by one man, the Hydraulic "A" Frame's labor-saving features makes it doubly attractive. Three different sizes have been in severe field operation for over a year; installing heavy motors, telephone poles, gas engines, transformers and other heavy equipment.

The Crescent "A" Frame

At present the Hydraulic "A" Frame is available in "1 Ton," "3 Ton," "5 Ton," and "10 Ton" lifting capacity and special sizes or tonnage requirements can be built to specifications.

The Hydraulic "A" Frame has many practical uses, in many varied fields. Among them are the construction, pipe line, oil producers, drilling contractors and electrical construction business. In short any industry that lifts and transports bulky articles and equipment. In addition to the labor-saving and truck-bed space saving features, Crescent Tool has been able to develop the Hydraulic "A" Frame unit at surprisingly low cost.

New Bulletin by National

Grip Elevator and Spider. Bulletin No. 347, 12 pages, 8½ x 11. Describes and fully illustrates the mechanical features of Ideal Automatic Grip Elevators and Spiders, in four sizes to handle casing ranging from 4¾ in. O. D. to 13⅜ in. O. D. and any length strings. The bulletin covers all details of design that contribute to long trouble-free service, includes lubrication procedure, specifications of four standard sizes and dimensional diagrams. Copies may be obtained by writing The National Supply Company, P. O. Box 899A, Toledo, Ohio.

Medearis Appointed Oilfield Distributor for Whitlock Cordage

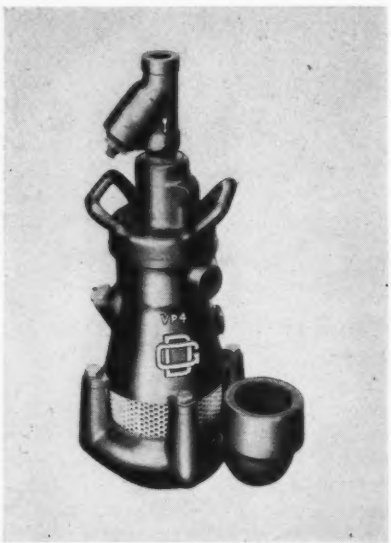
Whitlock Cordage Company are pleased to announce that Medearis Oil Well Supply Company are distributing Whitlock Rope to the Oilfields of the West Coast. Whitlock Cordage Company, for years, have been active in supplying the needs of the oilfields not only to the West Coast, but also in the Midwestern and Southern States.

The Medearis Oil Well Supply Company are well and favorably known in the supply business and are carrying a complete line of cordage for the oilfield industry, and the trade can be assured that any taken care of promptly.

Mr. B. B. Walker, Pacific Coast needs for oilfield purchases will be Manager for Whitlock Cordage Co., will assist the Medearis Company in their sales and service to the western oil industry.

New Top Suction Sump Pump Announced by Gardner-Denver

Designed to overcome one of the most common causes of pump failure—breaking of the pump shaft seal because of water pressure—a new sump pump, known as the VP-4 has just been announced by the Gardner-Denver Company.



The design of the VP-4 embodies a new principle—"top suction." Because of this feature, the oil seal of the VP-4 is subjected only to static pressure from depth of immersion when the pump is not in operation. When the pump operates, water cannot reach the oil seal on air motor.

The VP-4 sump pump is operated by a powerful van-type air motor. The pump impeller of the closed type is made of exceptionally hard, abrasion resistant alloy. A built-in oiler lubricates all moving parts of the pump with oil, the oil chamber having one-quart capacity for 24 hours' normal operation. This feature of the VP-4 eliminates the grease fittings ordinarily used, which, when neglected, are a frequent cause of bearing failure.

The VP-4 pump is light in weight and easy to move from place to place. Substantial handles welded to the housing assure greater ease in lifting and carrying.

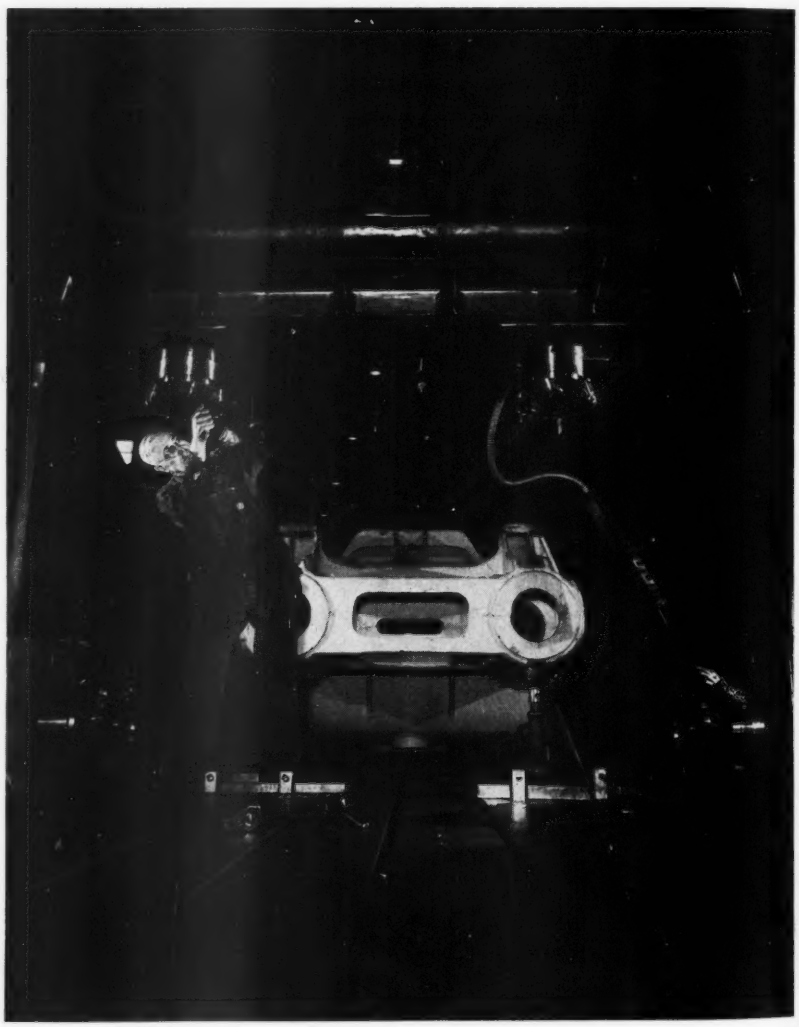
Progress is the American Way of life. The petroleum industry IS progressive.

Vernon Tool Introduces New Stuffing Box

The Vernon Tool Company, Ltd., announces their new Vernon "Fluid-Sealed" Stuffing Box, that is said to have the following features:

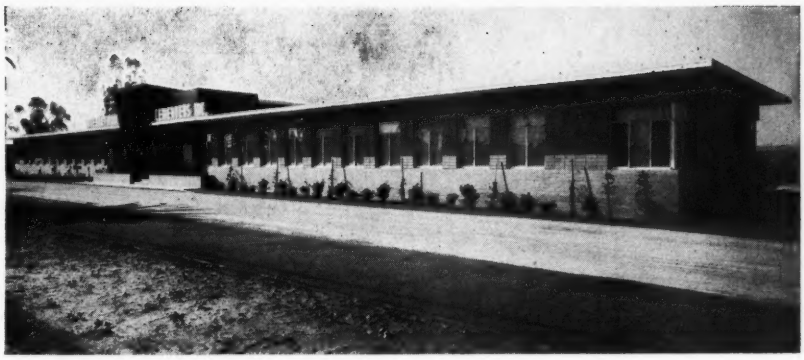
1. The only metal parts that may contact the polish rod are made of brass which eliminates the danger of scoring the rod and indefinitely prolongs the life of the packing element.
2. A long-lasting, one-piece, oil resistant packing element. Should it be necessary to replace, the process is rapid, inexpensive, and requires no tools.
3. Packs off firmly around rod through action of fluid pressure within a specially moulded packing element. Torque-free ball bearing raced cap must only be taken up hand tight for effective pack off.
4. Heavy walled steel body has standard 8V thread to fit conventional well head.

For additional information and literature, write to Vernon Tool Co., Ltd., 1101 Meridan Ave., Alhambra, California.



Electronically-controlled, this giant planer type milling machine is one of 40 new machine tools installed at Wilson-Snyder Manufacturing Division of U. S. Steel's Oil Well Supply Co., in a just-completed post-war expansion program that will boost the Braddock plant's output of oil country pumps 50 per cent. Robert E. Zeak is adjusting one of the big machine's multiple-edge revolving cutters. Directly behind him is an 18,000 pound casting, ready to be machined into a gear assembly housing and dangling at the right is push-button keyboard used to operate the device.

International Cementers, Inc. Moves Into New Building



On January 1, 1948 International Cementers, Inc. moved into their fine new office building at 6505 Paramount Boulevard in Long Beach. This completes the installation which started with a bulk cement and acid plant finished in 1945 and the Long Beach District warehouse, garage and offices for their cementing and chemical services completed in July, 1947. Now all the executive and general offices, plus the Southern California service facilities, are at one central location for more efficient handling of their large service business.

The new office is a one-story building of concrete block construction in a colorful and pleasing contemporary design with a large reception hall at the center of two long wings, one of which houses the private offices for the executive, administrative and engineering staff, while the other holds the accounting and clerical offices, conference room, coffee bar and storage rooms. Perliter and Soring were the engineers for the building.

Modern design of facilities, lighting, air conditioning and heating make the building a comfortable and desirable place for I.C.I. personnel to work.

Atlas Production Appointed Distributor for Driscose

J. Paul Sievers, President of Atlas Production Inc., Los Angeles, announces the acquirement of DRISCOSE, a product of Drilling Specialties Company, for California distribution by the Chemical Division of the company.

"Recent research in the use of Carboxymethylcellulose (of which DRISCOSE is a special form) as an organic colloidal additive to water base muds is making favorable showings in view of information gathered from its established use in many fields," states Mr. Sievers. "DRISCOSE, a sodium salt, is used where hydration of bentontic shales must be avoided. Savings of weighting materials, drilling, and reaming time are possible due to the low water loss of muds so treated and, of particular interest to the Western operator is the counteraction to clay swelling obtainable where DRISCOSE is used."

Mr. Sievers further stated that "Reports by field service engineers for Atlas Production show that electric logs are as good as can be obtained in any mud and the mud cake is easier to remove and thinner than is usually the case. Greater resistance to cement contamination and salt water flows is the usual result with the use of muds to which DRISCOSE has been added. Therefore, it is only natural that the constant reduction of water loss allows less of the mud constituents to be used on any given well."

Mr. Sievers called particular attention to the decrease of hydration shales which lessens the amount and extent of oversize hole and the amount of cement needed and improves the accuracy of cement placement. "This is of benefit in fishing jobs in assuring that the pipe will not so often hide behind ridges above oversize hole." Mr. Sievers directed particular attention to the fact that the only chemicals required to control mud viscosity where DRISCOSE is used are caustic soda and quebracho, bringing about, thereby, a general lowering of costs per foot — sometimes as much as 33 1/3 per cent of the total mud cost—with this organic colloid additive. "Savings of from $5,000 to $10,000 for a hole are possible," said Mr. Sievers.

"Atlas Production Inc. is glad to be able to add this new product to their Chemical Division," and Mr. Sievers made it quite clear that their organization will be glad to discuss any mud problems that may be benefited by the use of DRISCOSE. "Extensive research into the application of DRISCOSE to the California operators' needs has been made by our company," concluded Mr. Sievers.

Progress is the American Way of life. The petroleum industry IS progressive.

New Booklets Issued by Tube Turns, Inc.

A new booklet, "Stainless Steel Piping—Why and Where to Use It," deals authoritatively with its subject and makes a welcome addition to the reference libraries of piping engineers. It was written by J. D. Mattimore, chief engineer of the product and research division of Tube Turns, Inc.

Among the subjects covered are:

Five major reasons for using stainless steel piping.

Types of stainless steels, with a detailed description of type 304, type 347, and type 316, which a survey indicates should serve 95% of industry's requirements.

Standardization of pipe and fittings.

Selection of Pipe joints.

Fabrication by welding, with an explanation of the preferred welding processes.

The booklet also contains numerous tables and illustrations.

Tube Turns, Inc. has also issued a new and enlarged edition of the booklet, "Allowable Working Pressures," which designers, fabricators and users of industrial piping systems will find an important and time-saving reference source.

The booklet gives allowable working pressures for Tube-Turn welding fittings in five classes of piping. The tables are based upon the ASME Boiler Construction Code, 1946 edition, and the American Standard Code for Pressure Piping,

ASA B31.1, 1942, as revised by supplement No. 2, ASA B31. lb, 1947.

The booklet's subjects deal with piping; gas and air piping (Division 1, within plant or city limits; and Division 2, cross country piping systems), oil piping within refinery limits, oil piping outside refinery limits, and district heating piping. Also covered are plant process piping, and hydraulic machinery piping, which are not included in the Code for Pressure Piping.

Also available to the oil industry is the Tube-Turn Catalog and Engineering Data Book No. 111, which has come to be regarded as the "bible" on the subject of welding fittings and flanges for industrial piping, which now has a 20 page supplement.

The supplement is devoted to specifications that cover new items in the continually expanding line of Tube-Turn fittings. It is 6" x 9" and slips easily into the pocket provided for this purpose on the inside back cover of No. 111.

The above described booklets and data books may be obtained without charge by writing to: Tube Turns, Inc., 224 E. Broadway, Louisville 1, Kentucky.

Page Oil Tools, Inc. Move to New Plant

Page Oil Tools, Inc. has recently moved into their newly completed plant and office situated at 3356 Lime Avenue, Long Beach, California. The new plant contains executive and administration offices and complete machine shop facilities for the development and manufacture of Page Tension Type Production Tools.

Patterson-Ballagh Announces New Streamlined Casing Protector

This new style Casing Protector is streamlined to insure the best protection for both casing and drill pipe. The rubber lips that have proven so successful in the older style Protectors, are still incorporated in the smooth contour of this new style. The streamlined shape minimizes turbulent mud flow around the Protector and permits a minimum change in the direction of mud flow. Formerly, abrupt changes in the direction of the mud around the Casing Protector produced a scouring action directly above and below the rubber and "ringing" of the drill pipe occurred.

Streamlined Casing Protectors are manufactured from the same Special PBX D 25 rubber that has proven itself in deep drilling. They will keep their shape in any type of mud or brine and always grip the pipe firmly. Notice the long contact surface that takes the wear instead of the casing or tool joint and the rugged lip construction that gives gripping power at each end of the Protector.

This new Streamlined Casing Protector is now available in most of the popular sizes and will soon be available in all sizes.

Progress is the American Way of life. The petroleum industry IS progressive.

The New Home of Page Oil Tools, Inc.

Atlas Production Announces New Line

J. Paul Sievers, President of Atlas Production Inc., Los Angeles, announced to the oil industry on Feb. 1st the fact that his company has acquired the B & B Knife Tool for oil field use from the B & B Oil Tool Company.

"In conjunction with our previously announced policy of bringing to the industry specialty products, both in our Mechanical and Chemical Divisions, always with an eye to outstanding merit, we have surveyed the entire country for the purpose of acquiring supplemental items to the now well-accepted HI-PERM so successfully offered by our Chemical Division," stated Mr. Sievers.

"The B & B Knife Tool is by far the outstanding development in its field of endeavor available to the production companies at this time," declared Mr. Sievers, "and we are proud of this opportunity to introduce to our many friends and customers a new service which will provide a means to greater production efficiency and subsequently more profitable oil production. Our company has long recognized a need for tools of the capabilities evidenced in the B & B line, which consists of highly specialized tools capable of fulfilling the requirements of any type job, and it is only after complete analysis of well requirements and extensive tests that we have decided to present these perfected tools to the oil industry."

Mr. Sievers pointed out further that many production companies have already found the B & B Knife Tool line an answer to their needs and a definite step forward for purposes of cleaning plugged-up perforations.

The primary requirements of any knife tool is in its adequacy to perform the job it is designed to do, and, for that reason, Mr. Sievers called special attention to the fact that there are many types of B & B tools available with adaptations possible in order to meet the exacting requirements of any particular job.

"We know that the industry at large will want much information and we are prepared to counsel and

advise with any production company interested with regard to the usage of the B & B Knife Tools for purposes of increasing well production and restoring the high permeability in the productive zone. It will be a real pleasure to bring this information and the result of extensive research to the attention of all who may seek it, as our entire organization is most anxious to cooperate," concluded Mr. Sievers.

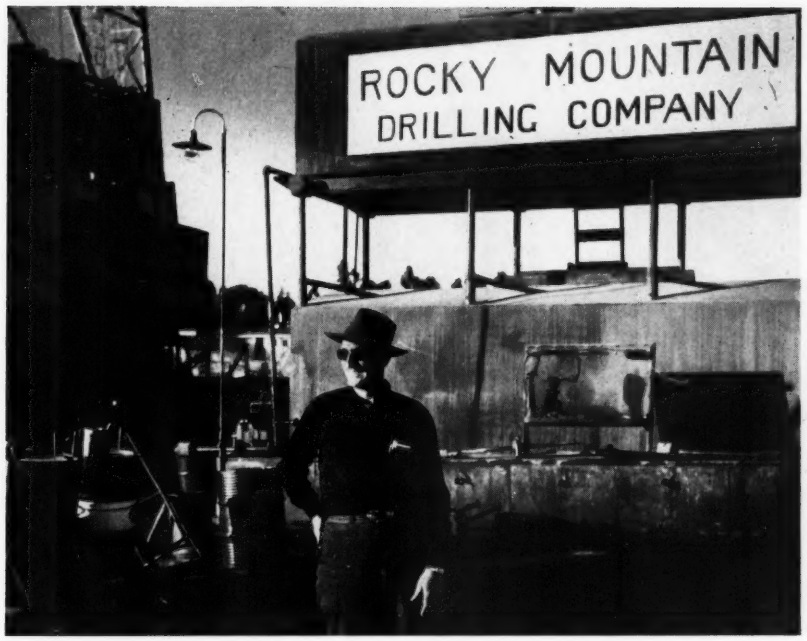
New Diesel Fuel Oil Additive Aids Drilling of Deepest Calif. Oil Exploration

The use of INDUCO FLUID, a new Diesel fuel oil additive, has helped Rocky Mountain Drilling Company establish a flock of records: first, the drilling of California's deepest oil exploration near Ventura (present depth 17,600 feet); second, continuous drilling operation which has broken all previous records (six heavy-duty Diesel engines have been kept on uninterrupted 24-hour service for seven months); third, only three engine oil changes have been made during this entire period (one at 1500 hours, another at 1600 and the last at 1700 hours).

During this entire gruelling nonstop push, engine checks indicated perfect combustion throughout, increased power output, sustained white smoke and a complete absence of motor sludge. According to Roy C. (Buck) Carpenter, pusher for Rocky Mountain, the company began using Induco Fluid in July, 1947, the beginning of the record-breaking run.

The Industrial Chemical Co., of Los Angeles, producer of the new type additive, explains that when Induco Fluid is added directly to Diesel fuel it takes immediate chemical action against the sulphur, rosin, gum and tar content of the average fuel oil, turns these into substances that will ignite efficiently upon injection. The result, as is well indicated by Rocky Mountain's remarkable record-breaking nonstop run is an increase in horsepower as well as fuel economy and an extended period of trouble-free engine operation.

Carpenter, who has been associated with Rocky Mountain since 1934, stated:



Roy C. Carpenter, Pusher for Rocky Mountain Drilling Co.

"I have never before enjoyed the additional power needed to carry on the exploration through trying hours to depths heretofore unattained in California's oil drilling activities.

"With no sludge in the motors, the perfect combustion attained with the use of INDUCO FLUID has helped make possible the seven month's uninterrupted operation of our four Superior Diesel engines and two G.M.C's . . . with savings in operation costs and savings in fuel and oil.

"Our mechanic, Ward Grange, remarked at each of the three oil changes, 'It's a damned shame to throw away such clean oil.'"

INDUCO FLUID is produced by the Industrial Chemical Co., 12130 South Main Street, Los Angeles 3, Calif. (Combustion Engineering Division, established in 1893). Contact this Division for technical application data.

New Bulletin by National

UNIT PUMPER. Bulletin No. 334, 20 pages, 8½ x 11 in. Describes and profusely illustrates three styles of National Type D-9 Unit Pumpers for medium pumping requirements, with approximate API walking beam ratings of 9,000 lb. and API peak torque ratings of 40,000 in. lb. The bulletin features serviceability achieved by engineering design, throughout, using explosion views of structural members and mechanisms for illustration. Also included are dimensioned assembly drawings and comprehensive specifications. Copies are available from The National Supply Company, P.O. Box 899A, Toledo, Ohio.

Harold Graham, Shell division operations supervisor, has completed a training course in flying at an Oakland aviation school. He holds a private license and he has accumulated more than 80 hours in the air.

Dehydration of crude oil was the subject of a round-table discussion at the meeting of the junior section of the Pacific Petroleum Chapter, American Mining and Metallurgical Engineers at the Rio Hondo Country Club. The panel was made up of J. N. Gregory, Shell division mechanical engineer; Marvin Busby, Union District production foreman; R. M. Fullaway, Standard production engineer; and Carl Tutschulte, Tide Water Associated district engineer.

Bottom Hole Flow Recorder

A new instrument to measure the rate of flow of fluids and gases in flowing and pumping wells has been developed by the Dale Company. The instrument is 1 11/16" outside diameter and 7' long. On the lower end there is a fluid trap resembling an inverted funnel which folds to 1½" diameter when the instrument is run into the well. When the instrument is below the tubing the fluid trap opens up to a 3" diameter and causes the fluid or gas to pass through a 1" orifice containing a small rotor mounted on jewel bearings. A sensitive electrical pickup counts the revolutions of the rotor, the number of revolutions per minute being recorded on 16mm film travelling at a constant speed. The film record is a series of dashes, each dash representing 20 revolutions of the rotor. There is no packing around the rotor shaft and the entire rotating unit is exposed to the well fluid. The jewel bearings supporting the rotor shaft are mounted in such a manner that sediment or foreign matter cannot effect the free movement of the rotor.

A maximum of 650 rpm and a minimum of 9 rpm have been recorded in well surveys. In laboratory tests 800 rpm have been recorded, which indicate the sensitivity of the apparatus.

The bottom hole flow recorder is run on a .072" diameter measuring line and is entirely self contained. In flowing wells a lubricator is used and the instrument can be run through 2½" or 2" tubing. In pumping wells the instrument is run into the well through the annulus between tubing and casing. In all cases the tubing has to be above the area to be surveyed. In making a survey, readings of three minutes duration are taken at stations through the area to be surveyed.

Referring to Figure 1, a survey in a flowing well. The first two stations were in the blank section of the liner just above the perforations. The flow at this point represents 100% of the total production. Below this point readings were taken at stations at different depths and the percentage of flow recorded. In this well most of the production was coming from the top set of perforations and the area below 2820' was not contributing any production. The survey shown in Figure 2 was made in a well producing gas and less than 10 barrels of oil per day. This survey clearly shows the area from which the gas is flowing.

Migration of fluids or gases from one zone to another have been recorded on numerous surveys. In some wells the sands indicated to be productive on the electric log, do not contribute to the production of the well. With this new instrument, which is operated by the Dale Company on a service basis, the engineer can obtain complete knowledge of the flowing conditions in the producing interval.

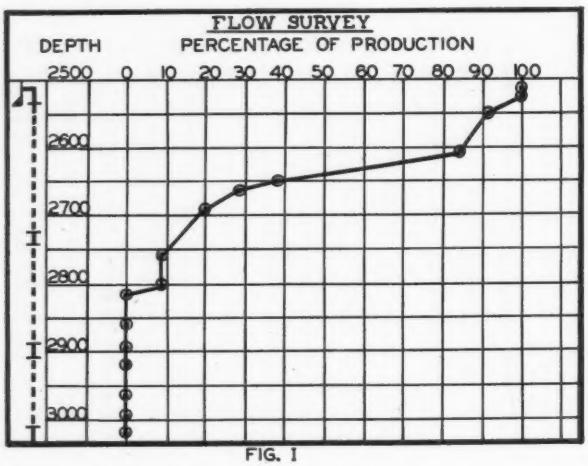


FIG. 1

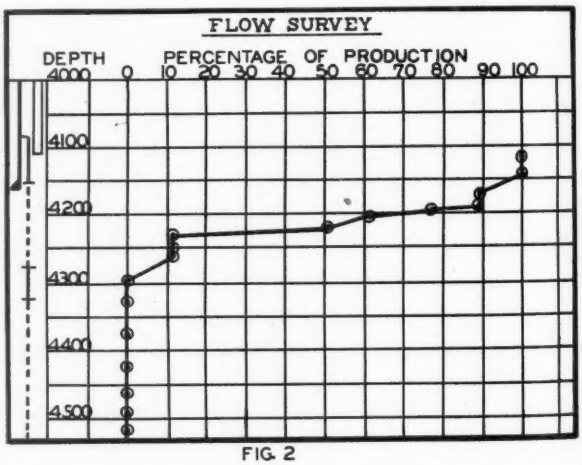


FIG. 2

Utilization of Short Change Paraffins

(Continued from Page 7)

and Drug Administration allows in edible products.

Propane is chlorinated under proper conditions to give a mixture of disubstituted propanes and propylenes. This mixture is used broadly as a soil fumigant for the control of nematodes. Its agricultural use was originally developed on the Hawaiian Islands for the control of nematodes in pineapple fields. For the past two or three years, nearly all pineapples have been grown in soil fumigated with chlorinated propanes and propenes.

All the above-mentioned derivatives from these simple paraffins and olefins are increasing in economic importance. This is one of the reasons for the increase in the use of petroleum and gas derivatives in the synthetic organic chemical industry. As an example, one of the chemical trade papers reported recently that in 1943 13% of the synthetic organic chemicals produced in this country was derived from petroleum products. In 1946 26% originated from petroleum. In other words, the American chemical industry is depending more and more on gas and petroleum for its starting materials.

Puente Wildcat Ready To Start

Hugh Alan Bardeen, California veteran oil producer, is ready to start work on his Lautenbach No. 1 wildcat test in Sec. 10-2s-10w in the Puente area of Los Angeles County. Location falls about one mile east of Bardeen Petroleum Corp.'s Didier No. 1, which was drilled years ago without commercial success to 5000 ft.